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A NEW AND COMPLETE
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————— *Huc undique Giza*
Congeritur ————— VIRG.

V O L . I I I .

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M D C C L X I V .



A NEW AND COMPLETE
 DICTIONARY
 OF
 ARTS and SCIENCES.



L A B

L, or l, the eleventh letter and eighth consonant of our alphabet. It is a semi-vowel, formed in the voice by intercepting the breath between the tip of the tongue and the fore-part of the palate, with the mouth open.

There is something of aspiration in its sound, and therefore the Britons usually double it, or add an *b* to it; as in *llan*, or *lhan*, a temple.

In english words of one syllable, it is doubled at the end; as in *all*, *wall*, *mill*, *wooll*, &c. but in words of more syllables than one, it is only single at the end; as in *foretel*, *proportional*, &c. It may be placed after most of the consonants, as in *blue*, *clear*, *flame*, &c. but before none of them.

As a numeral letter, L denotes 50; and with a dash over it, thus, \overline{L} , 50000. Used as an abbreviature, L stands for Lucius; and L. L. S. for a sesterce. See the article SESTERCE.

LA, in music, the syllable by which Guido denotes the last sound of each hexachord: if it begins in C, it answers to our A; if in G, to E; and if in F, to D.

LABARUM, in roman antiquity, the standard borne before the roman emperors; being a rich purple streamer, supported by a spear.

LABDANUM, or **LADANUM**, a resin of the softer kind, though of too firm a consistence to be ranked among the fluid ones. See the article RESIN.

There are two kinds of it kept in the shops; one usually imported in bladders,

to preserve it in its genuine soft consistence, and to prevent the evaporation of its finer parts; another in rolls, much inferior to the former in purity and virtue.

Labdanum should be chosen soft and moist, of a strong smell, pure, very inflammable, and diffusing a fragrant smell while burning. It is a resinous juice which exsudates from a tree of the cistus-kind, and is collected in the following manner: they make a kind of wooden rake, but without teeth, and to this they affix a number of long thongs of untanned leather: this instrument they draw several times over the shrubs, during the heat of the day, and afterwards scraping off the resin from these thongs, put it up for use. What is collected pure and free from dust, is seldom sold so; the peasants, who sell it by weight, to increase their profit, usually mixing a kind of dusky coloured heavy sand among it.

In medicine it is used externally, to attenuate and discuss tumours; internally it is more rarely used, but it is greatly extolled by some against catarrhs, and in dysenteries: its dose, in these cases, is from five grains to thirty: it has been made an ingredient in several of the old compositions of the shops, but is at present much disused.

LABEL, in heraldry, a fillet usually placed in the middle along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief.

chief. It is adorned with pendants; and when there are above three of these, the number must be specified in blazoning.

This is a kind of addition to the arms of a second brother, to distinguish him from the first, and is esteemed the most honourable of all differences. See plate CLII. fig. 1.

LABEL, in law, a narrow slip of parchment hanging from a deed, writ, or other writing, in order to hold the appending seal. See the article **SEAL**.

LABEL of a circumferentor, a long thin brass-ruler, with a sight at one end, and a center hole at the other; chiefly used with a tangent line, to take altitudes.

LABIAL LETTERS, those pronounced chiefly by means of the lips. See the article **LETTER**.

LABIATED FLOWERS, monopetalous flowers, consisting of a narrow tube, with a wide mouth, divided into two or more lips. See **BOTANY** and **FLOWER**.

LABIAU, a port-town of Prussia, situated on a bay of the Baltic sea, twenty miles north-east of Königsburg: east long. $22^{\circ} 15'$, north lat. 55° .

LABIUM, **LIP**, in anatomy. See **LIP**.

LABORATORY, or **ELABORATORY**, the chemists work-house, or the place where they perform their operations; where the furnaces are built, their vessels kept, &c. and in general, the term laboratory, is applied to any place where physical experiments, in pharmacy, chemistry, pyrotechny, &c. are performed. See the article **FURNACE**, &c.

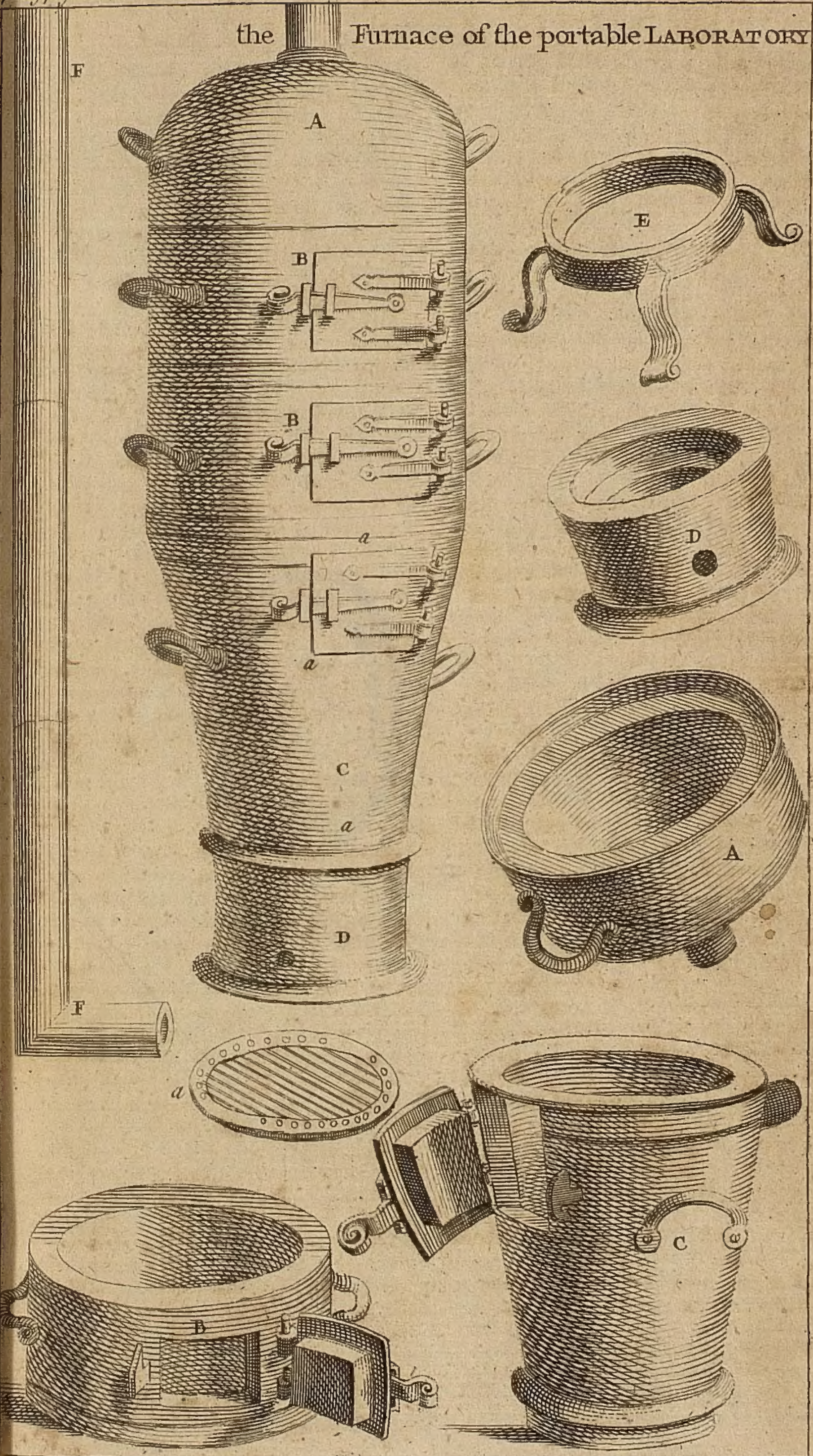
A principal obstacle to the general exercise of chemistry being the difficulty of procuring proper furnaces, vessels, utensils and materials for the purpose, a portable laboratory was introduced by Dr. Shaw, by means of which alone all the chemical operations may be commodiously performed. This laboratory consists of three parts, *viz.* a furnace, an apparatus, and a materia chemica. The furnace, an internal and external view of which is represented in plate CLI. has four principal parts. 1. The cover A, with its upright funnel. 2. The two rings BB. 3. The body C. And, 4. The foot D. The general office and use of the cover is to check, suppress, and throw back the heat and flame, or prevent the fuel from spending itself too fast, as it otherwise would do, with little effect in many operations. In order to encrease the draught, and squeeze the air more forcibly through the body

of the fuel, there is a moveable chimney FF, that may occasionally be fixed to the orifice left for that and other purposes in the top of the cover. The ring is the seat of numerous operations; the subject to be acted on by the fire being frequently lodged therein; and in other cases it helps to enlarge the furnace, and render it capable of operations, which it could not otherwise perform. The body serves to contain the fuel, and is the common seat of the fire. In many cases of fusion, as in running of metals from their ore, it performs at the same time the office of a crucible, and contains the subject mixed along with the fuel, after the manner practised in the smelting-houses. To this body belong three several grates, *a, a, a*, that may be placed at different heights therein, according to the nature of the operation, and the distance required between the subject and the fire. Lastly, the foot, whereof there are two kinds, D and E, is not only of use in supporting the other parts, but also in receiving the ashes of the fuel and the melted matters that, by the fire, are made to flow and run down into it; and thus performing the office of a receiver, it is of singular use in collecting and preserving substances that might otherwise be spilt or lost.

The more immediate appurtenances of this furnace are fuel and bellows. The fuel may be charcoal; or as there is a contrivance for a vent or flew in the body of the furnace, common sea-coal may be employed, and the smoke directed up the chimney of the room where the furnace is to stand. Its structure is also well fitted for a lamp, which in many cases, as particularly some curious digestions and calcinations, is highly necessary; and by this means also may the operations which would otherwise require the athanor, or a long continued uniform heat, be elegantly performed.

It would be tedious to shew how all the numerous operations of chemistry are performable by means of this furnace: it may suffice to consider the general states or conditions into which the instrument may be put for the principal of them. The simplest state of this furnace is a combination of two parts, the body and the foot, which is thus fit for fusion, by the naked fire, when the matter to be melted is mixed among the fuel, as in running the ores of lead, tin, or iron, for instance. By barely placing the middle grate

the Furnace of the portable LABORATORY



J. Jefferys sculp



grate in the body, the instrument becomes a melting-furnace for a crucible. When only the body of the furnace with its middle grate is set upon the foot, it answers all the ends of the common shop-furnace of the apothecaries for decoctions, inspissations, extraction, &c. and the purposes of a naked fire for certain distillations, sublimations, and the like. It may moreover be readily converted into a balneum mariae, an ash-pot, a sand-heat, or a still stronger for digestion, &c. by barely setting upon it a pan of water, ashes, sand, or iron-filings. If instead of a common pan, the ring furnished with its set of pots be set upon the body with its grate, you have a furnace fitted for distillation in *capella vacua*, where the retorts are contained in the cavity of the pots, and locked down therein without any visible medium between. An iron-pan placed in the room of the ring just mentioned, makes a calcining furnace; the lowest grate being used, either a cold still or a hot one may be put into the body, and worked as in the common manner, with its proper head and refrigeratory. The application of the cover to the hollow ring, and sometimes to the body without the ring, makes a proper reverberatory furnace.

The outer case of this furnace is best made of plated iron, formed in separate pieces of the figures expressed in the plate, and of such a size as the operator shall choose, observing the same proportion between the parts as the plate exhibits: the inner side of all the parts are to be lined, the thickness of an inch at least, with a proper luting.

All the chemical apparatus may be divided into remote and intermediate, or such as is preparatory to the operations, and such as is actually employed therein: the remote apparatus of this portable furnace consists of scales, weights and measures; also mortars, sieves, rasps, files, hammers, sheers, and forceps. Next to these are the instruments for managing the fire, as shovels, hooks, tongs, and blow-pipes. Also for charging the vessels with the subject matters of the operations, as shells, horns, tin-plates, brushes, hares-feet, &c. also for emptying the productions, hooked tongs, ingots, cones, basons, funnels, &c. In the last place come the instruments for making certain utensils, as cores for muffles, moulds for tests, crucibles and melting-pots, and irons for cutting glasses and the necks

of retorts. For a proper description of these instruments, utensils, &c. see each under its proper head.

The *materia chemica*, that is the subject to be worked upon or immediately and materially employed in chemical operations, is the next thing to be considered as the constituent parts of a laboratory: this is a large field, and comprehends all the natural bodies on our globe, which are all subject matters of chemistry; and are all separately treated of under their proper heads through the course of this work.

LABOUR, in general, denotes a close application to work or business. Among seamen a ship is said to be in labour, when she rolls and tumbles very much, either a hull, under sail, or at anchor. It is also spoke of a woman in travel, or child-birth. See **DELIVERY**.

LABOURER, generally signifies one that does the most slavish and less artful part of a laborious work, as that of husbandry, masonry, &c.

An antient statute ordains, that the wages of labourers shall be yearly assessed by the sheriff and justices of the peace of every county in the easter-sessions; and in corporations, by head officers; and if they take work by the great, and leave the same unfinished, except it be for the non-payment of wages, or where they are employed in the king's service, &c. they shall be imprisoned one month, and forfeit 5*l*. The hours that labourers shall work in the day are also appointed, on pain of forfeiting one penny for every hour's absence; and all labourers may be compelled to serve by the day in the time of corn and hay-harvest.

LABRADOR, also called New Britain, and Eskimaux, is a country in North America, bounded by Hudson's Straits and the Atlantic Ocean, on the north; by the same ocean, on the east; by the river of St. Lawrence and Canada, on the south; and by Hudson's bay, on the west: situated between 59° and 79° of west long. and between 50° and 64° of north lat.

LABRAX, in ichthyology, a species of perch, with fourteen rays in the fin besides the anus. See **PEARCH**.

LABRUS, in ichthyology, a genus of acanthopterygious fishes, with six bony rays in the membrane of the gills; add to this, that the lips are thick, and the rays of the back-fin anteriorly double.

The name *labrus* is given to the fishes of this

this genus, on account of the thickness of their lips.

LABURNUM, in botany, is only a species of *cytiscus*. See **CYTISUS**.

LABYRINTH, in anatomy, the internal cavity of the ear, so called from sinuities and windings. See **EAR**.

LABYRINTH, in gardening, a winding mazy walk between hedges, through a wood or wilderness. The chief aim is to make the walks so perplexed and intricate, that a person may lose himself in them, and meet with as great a number of disappointments as possible. They are rarely to be met with, except in great and noble gardens, as Versailles, Hampton court, &c.

There are two ways of making them; the first is with single hedges: this method has been practised in England; and these may, indeed, be best, where there is but a small spot of ground allowed for making them; but where there is ground enough, the double is most eligible. Those made with double hedges, with a considerable thickness of wood between them, are approved as much better than single ones: this is the manner of making them in France and other places; of all which that of Versailles is allowed to be the noblest of its kind in the world. It is an error to make them too narrow; for that makes it necessary to keep the hedges close clipped: but if, according to the foreign practice, they are made wide, they will not stand in need of it. The walks are made with gravel usually set with horn-beam: the palisades ought to be ten, twelve, or fourteen feet high: the hornbeam should be kept cut, and the walks rolled.

LAC-MILK, among physicians, &c. See the article **MILK**.

The appellation lac is also given to several chemical preparations, as, 1. Lac ammoniaci, which is ordered by the college to be made in the following manner: take of gum ammoniac, two drams; of simple penny-royal water, half a pint; and rub the gum in a mortar with the water, till it is dissolved, which it will do without heat. 2. Lac sulphuris, called also precipitated sulphur. See **SULPHUR**.

LAC LUNÆ, in natural history, a name sometimes given to mineral agaric. See the article **AGARIC**.

LACCA, in natural history, &c. a vegetable production, improperly called gum, as being inflammable, and not soluble in water.

There are three kinds of lacca kept in the shops, which are all the products of a species of *ziziphus*. See **ZIZIPHUS**.

The stick-lacca is a hard, resinous, and friable substance, of an uneven and granulated surface, and of a roundish but somewhat dusky colour. It is of an austere and subastringent taste, and is fixed round certain sticks, and branches of a woody substance. The seed-lacca is brought to us in loose grains, or little masses, of a roundish irregular figure, and of a reddish colour, which seem no way different from the stick-lacca, but as parts from the whole. The third kind, or shell-lacca, is met with in thin and transparent cakes, made by melting the above granules, or what is taken from the sticks, into a mass. Some affirm that it exudes from the jujube, and several other trees of the same genus; but others assert that it is no vegetable exudation at all, but a substance analogous to wax laid on these branches by insects. Till we have some very good observer on the spot, to determine between the positive assertions of the several authors who have wrote upon it, we must be contented to rest in uncertainty: but whatever may be the history of this drug, its virtues are less in dispute; it is an attenuant, aperient, and diuretic, and is sometimes prescribed in disorders of the liver and spleen, and in jaundices and dropsies. It would probably be in more use, if we knew how to open its body, so as to make it exert its virtues; for it is a sort of unchangeable medicine which passes the body very little altered, if given in substance; and it is of the number of those things from which a tincture is very difficultly extracted. But besides these virtues, a beautiful red colour is prepared from it by only boiling stick-lacca in water, and then filtrating the decoction, and evaporating the superfluous humidity. This lacca is of great use in painting, on which account its name has been given to several colours procured from other ingredients in much the same manner.

Artificial **LACCA**, or **LAKE**, a colouring drug obtained from certain vegetables.

Of these there are different kinds. 1. To make a fine red lake: take half a pound of good brazil, boil it in three pints of lye, made of the ashes of vine sprigs, till it be half evaporated; then let it settle and strain it off. Then boil it again with fresh brazil, a quarter of a pound; cochineal,

cochineal, two pounds; and terra merita, half an ounce; adding to it a pint of fair water; let it boil till it be half evaporated as before, then set it by to settle and strain it. But when you take it off the fire, put in half an ounce of burnt alum reduced to an impalpable powder; let it dissolve, stirring it with a stick, and add to it a quarter of a dram of arsenic. In order to give it a body, reduce two cuttle-fish bones to a fine powder, put it in, and leave it to dry at leisure, and then grind it with a good quantity of fair water, in which leave it to steep; afterwards strain it through a cloth, make it up into small cakes, and set them to dry on cards or paste-board. If you would have this lake redder, add to it lemon-juice; and if you would have it deeper, add to it oil of tartar. 2. To make columbine-lake: steep half a pound of the finest brazil-wood of Fernambouc, rasped in three pints of the most subtilly distilled vinegar, for at least a month, and if it be for six weeks, it will be the better. After which, boil all in balneo marie for about a minute, and leave it for a day or two; after which, put a quarter part of alum-powder into a very clean earthen pan, and strain the liquor upon it through a cloth, and so let it remain for a day; then heat the whole till it simmers, and leaving it again for twenty-four hours, reduce two cuttle-fish bones into powder, and having warmed the liquor, pour it upon them; then stir the whole with a stick till it is cool, and leave it again for twenty-four hours before you strain it. 3. To make lake of turmeric: take a pound of turmeric-root, reduced to a fine powder, three pints of fair water, and an ounce of salt of tartar; put them into a glazed earthen vessel, and let them boil together gently over a clear fire, till the water appears richly impregnated with the turmeric, or will stain a piece of white paper beautifully yellow; then filter the liquor, and gradually add to it a strong aqueous solution of roach-alum, till the yellow matter is all curdled together, or precipitated; after this filtre the whole through paper, when the aqueous part will run off, and leave a yellow matter behind; which beingedulcorated, or washed in the filtre, by the repeated affusion of fresh water, till the water comes away insipid; and being afterwards dried, it becomes a beautiful yellow for painting.

LACE, in commerce, a work composed of

many threads of gold, silver or silk, interwoven the one with the other, and worked upon a pillow with spindles, according to the pattern designed. The open work being formed with pins, which are placed and displaced as the spindles are moved. See the article **GOLD-THREAD**.

The importation of gold and silver-lace is prohibited.

Bone-LACE, a lace made of fine linen thread or silk, much in the same manner as that of gold and silver. The pattern of the lace is fixed upon a large round pillow, and pins being stuck into the holes or openings in the pattern, the threads are interwoven by means of a number of bobbins made of bone or ivory, each of which contains a small quantity of fine thread, in such a manner as to make the lace exactly resemble the pattern. There are several towns in England, and particularly in Buckinghamshire, that carry on this manufacture; but vast quantities of the finest laces have been imported from Flanders.

The duties on foreign bone-lace are as follow: bone-lace of thread, the dozen yards pays, on importation, 15s. 4 $\frac{8}{10}$ d. and draws back, on exportation, 13s. 6d. Purl or antlet-lace of thread, the groce, pays 3s. 10 $\frac{2}{10}$ d. Silk bone-lace the pound, containing sixteen ounces, pays 11l. 10s. 10 $\frac{1}{2}$ d.

LACE is also used for a kind of chord made of silk or cotton, chiefly used in lacing womens stays.

LACEDEMON, the antient name of Mithra. See the article **MISITHRA**.

LACERTA, the lizard, in zoology. See the article **LIZARD**.

LACHNÆA, in botany, a genus of the octandria-monogynia class of plants, without any flower petals: there is no pericarpium; the seed, which is single, oval, and obliquely acute, being contained in the bottom of the cup. It differs from the passerina only in having its cup divided into unequal segments.

LACHNIS, in natural history, a genus of fibrariæ; being fibrose, unelastic bodies, composed of short or abrupt filaments. See the article **FIBRARIÆ**.

LACHRYMAL, in anatomy, an appellation given to several parts of the eye, from their serving to secrete the tears. The lachrymal gland is situated in the orbit above the smaller angle, and its excretory ducts under the upper eye-lid: these are much more easily demonstrated

in

in the eye of an ox, than in a human one. The lachrymal caruncle is situated in the larger angle, or canthus, serving to direct the tears to the two puncta lachrymalia; which are situated in the same angle, at the extremities of the tarsi or cartilages, and terminate in the lachrymal sacculus, the nasal canal, and in the nose itself. See the article EYE.

LACHRYMALIS FISTULA, in surgery and medicine. See FISTULA.

LACHRYMATORY, in antiquity, a vessel wherein were collected the tears of a deceased person's friends, and preserved along with the ashes and urn.

LACINIATED-LEAF, among botanists, expresses a leaf which has several sinuses down to the middle, and, the lobes which separate these not smooth but notched, or indented. See LEAF.

LACONISM, *λακονισμος*, in matters of style, a short, pithy observation or saying; so called from the Lacedæmonians, who were remarkable for the conciseness of their discourse. See STYLE.

LACRYMAL, or **LACHRYMAL**. See the article LACHRYMAL.

LACTEA, or **VIA LACTEA**, the same with galaxy. See GALAXY.

LACTEAL VESSELS, in anatomy, fine subtle canals situated in the intestines and mesentery, and serving to convey the chyle to its destined place. See the article CHYLE.

Asellius, who demonstrated them in 1622, has the honour of passing for the first discoverer of them; but they were long before observed by Erasistratus and Galen, who took them for arteries containing milk.

The most convenient method of demonstrating them, is in comparative anatomy, by feeding some animal plentifully; and, in about three hours afterwards, strangling it. In this case, they are all turgid with chyle: whereas, at other times, they are filled with a lymphatic juice, not with chyle; and accordingly are called lymphatics, not chyliferous vessels.

The origin of these vessels is from the intestines, and principally from the small ones: in all these they are extremely numerous, but few or none of them can be seen in the larger guts.

Anatomists distinguish two kinds of them, which they call lacteals of the first and second order. Those of the first order, are such as run from the intestines

to the glands of the mesentery: those of the second order, are such as run from the glands to the receptacles and thoracic duct, where they terminate. These last are larger than the former, but they are fewer in number. See DUCT, THORACIC, CHYLIFICATION, &c.

LACTIFEROUS, an appellation given to plants abounding with a milky juice, as the sow-thistle, and the like.

LACTUCA, **LETTUCE**, in botany. See the article LETTUCE.

LACUNÆ, in anatomy, certain oscular orifices, proceeding from the glandulæ substratæ in the vagina, and often so large as to admit a bristle. Their use is to secrete a fluid for lubricating the vagina, and stimulating to venery.

LACUNAR, in architecture, an arched roof or ceiling, more especially the plank-ing or flooring above porticos and piazzas.

LADANUM, or **LABDANUM**, in pharmacy. See the article LABDANUM.

LADENBURG, a town of Germany, situated on the river Neckar; eight miles north-west of Heidelberg.

LADING, in merchandize, &c. taken into a ship, for which the master gives a bill of lading. See the article BILL.

LADOGA LAKE, in russian Finland, communicates with the gulph of Finland by the river Nieva.

LADOGNA, or **LACEDOGNA**, a city and bishop's see of the kingdom of Naples, fifty-five miles east of the city of Naples.

LADRONE ISLANDS, are situated in the Pacific Ocean, between 12° and 28° of north lat. and about 140° east long.

LADY'S BEDSTRAW, a plant called by botanists gallium. See GALLIUM.

LADY'S BOWER, the same with clematis, or virgin's bower.

LADY-COW, in zoology. See the article HEMISPHERIA.

LADY'S COMB, a plant otherwise called scandix. See the article SCANDIX.

LADY'S MANTLE, the english name of the alchimilla. See ALCHIMILLA.

LADY'S SEAL, a name by which some call tamnus. See the article TAMNUS.

LADY'S SMOCK, the english name of cardamine. See the article CARDAMINE.

LADY'S SLIPPER, the english name of the cypripedium. See CYPRIPEDIUM.

LADY'S TRACES, a name by which some call orchis. See the article ORCHIS.

LADY-DAY, in law, the 25th of March, being the annunciation of the holy virgin. See ANNUNCIATION.

LAGAN,

LAGAN, or **LAGON**, in law. See the article **FLOTSON**.

LAGANUM, in natural history, a genus of the echini marini, or centronia, with their mouth in the middle of the base of the shell. See **CENTRONIA**.

LAGOCEPHALUS, in ichthyology, a species of globe-fish, so called from its head being something like that of a hare. See the article **ORBIS**.

LAGOECIA, **ROUND-HEADED CUMMIN**, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of five petals, very short, and bicornate: there is no pericarpium, the seed, which is single, being contained in the cup.

This plant has neither the smell, appearance, or taste of cummin; its smell being more like that of the carrot.

LAGOPHTHALMIA, in surgery, an eversion and gaping of the eye-lids, otherwise called **ectropium**. See the article **ECTROPIUM**.

LAGOPUS, in ornithology, a species of tetrao, the whole body of which, excepting the tail, is white; the tail too is white, or at least tipped with white. It is about the size of a tame pigeon.

LAGOS, a port-town of Portugal, in the province of Algarva: west long. $9^{\circ} 27'$, north lat. $36^{\circ} 45'$.

LAGURUS, in botany, a genus of the triandria-digynia class of plants, the flower of which consists of two oblong valves, and serves as a pericarpium to inclose the seed, which is single and aristated.

LAHOLM, a port-town of Gothland, in Sweden, sixty miles north of Copenhagen.

LAHOR, the capital of a province of the same name in the hither India: east long. 75° , and north lat. 33° .

LAIR, among sportsmen, the place where the deer harbour by day. This term is also used to signify a place where cattle usually rest under some shelter: by which means the ground generally becomes enriched with their dung.

LAKE, a collection of waters contained in some cavity in an inland place, of a large extent, surrounded with land, and having no communication with the ocean. Lakes may be divided into four kinds. 1. Such as neither receive nor send forth rivers. 2. Such as emit rivers, without receiving any. 3. Such as receive rivers, without emitting any. And 4. Such as both receive and send forth rivers.

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Of the first kind, some are temporary and others perennial: most of those that are temporary owe their origin to the rain, and the cavity or depression of the place in which they are lodged: thus in India there are several such lakes made by the industry of the natives, of which some are a mile, and some two in circuit; these are surrounded with a stone wall, and being filled in the rainy months, supply the inhabitants in dry seasons, who live at a great distance from springs or rivers. There are also several of this kind formed by the inundations of the Nile and the Niger; and in Muscovy, Finland, and Lapland, there are many lakes formed partly by the rains and partly by the melting of the ice and snow: but most of the perennial lakes which neither receive nor emit rivers, probably owe their rise to springs at the bottom, by which they are constantly supplied. The second kind of lakes, which emit, without receiving rivers, is very numerous. Many rivers flow from these as out of cisterns; where their springs being situated low within a hollow place, first fill the cavity and make it a lake, which not being capacious enough to hold all the water, it overflows and forms a river: of this kind is the Wolga, at the head of the river Wolga; the lake Odium, at the head of the Tanais; the Adac, from whence one branch of the river Tigris flows; the Ozero, or White lake in Muscovy, is the source of the river Shackina. The great lake Chaamay, which emits four very large rivers, which water the countries of Siam, Pegu, &c. viz. the Menan, the Asa, the Caipoumo, and the Laquia, &c.

The third species of lakes, which receive rivers but emit none, apparently owe their origin to those rivers which in their progress from their source, falling into some extensive cavity, are collected together, and form a lake of such dimensions, as may lose as much by exhalation, as it continually receives from these sources: of this kind is that great lake improperly called the Caspian sea; the lake Asphaltites, also called the Dead sea; the lake of Geneva, and several others. Of the fourth species, which both receive and emit rivers, we reckon three kinds, as the quantity they emit is greater, equal, or less than they receive. If it be greater, it is plain that they must be supplied by springs at the bottom; if less, the surplus of the water is probably

spent in exhalations; and if it be equal, their springs just supply what is evaporated by the sun.

Lakes are also divided into those of fresh water, and those of salt. Dr. Halley is of opinion, that all great perennial lakes are saline, either in a greater or less degree; and that this saltiness encreases with time: and on this foundation he proposes a method for determining the age of the world.

Large lakes answer the most valuable purposes in the northern regions, the warm vapours that arise from them moderating the pinching cold of those climates; and what is still a greater advantage, when they are placed in warmer climates at a great distance from the sea, the exhalations raised from them by the sun, cause the countries that border upon them to be refreshed with frequent showers, and consequently prevent their being barren deserts.

LALAND, an island of Denmark, situated south of Zeland, from which it is separated by a narrow canal: east long. 12° , north lat. 55° .

LAMA, the sovereign pontiff or rather god of the asiatic Tartars, inhabiting the country of Barantola. The lama is not only adored by the inhabitants of the country, but also by the kings of Tartary, who send him rich presents, and go in pilgrimage to pay him adoration, calling him *lama-congin*, i. e. god the everlasting father of heaven. He is never to be seen but in a secret place of his palace, amidst a great number of lamps, sitting cross legged upon a cushion, and adorned all over with gold and precious stones; where, at a distance, they prostrate themselves before him, it not being lawful for any to kiss even his feet. He is called the great lama, or lama of lamas, that is, priest of priests. And to persuade the people that he is immortal, the inferior priests, when he dies, substitute another in his stead, and so continue the cheat from generation to generation. These priests persuade the people, that the lama was raised from death many hundred years ago, that he has lived ever since, and will continue to live for ever.

LAMB, in zoology, the young of the sheep-kind. See the article SHEEP.

A male lamb of the first year is called a wedder-hog, and the female, a ewe-hog; the second year it is called a wedder, and the female a sheave. If a lamb be sick, mare's milk with water may be given it;

and by blowing into the mouth, many have been recovered after appearing dead. The best season for weaning them, is when they are sixteen or eighteen weeks old; and about Michaelmas, the males should be separated from the females, and such males as are not designed for rams, gelded.

LAMBALLA, a town of France, twenty-three miles south-west of St. Malo.

LAMBDOIDES, in anatomy, one of the sutures of the skull. See SKULL.

LAMBESSE, a town of Provence, in France, nine miles north of Aix.

LAMEGO, a city of Portugal: west long. $8^{\circ} 6'$, north lat. $41^{\circ} 15'$.

LAMELLÆ, in natural history, denotes very thin plates, such as the scales of fish are composed of.

LAMENESS, among farriers. See the article HALTING.

LAMENTATIONS, a canonical book of the Old Testament, written by the prophet Jeremiah. The two first chapters of this book are employed in describing the calamities of the siege of Jerusalem. In the third, the author deplores the persecutions he himself had suffered. The fourth turns upon the desolation of the city and temple, and the misfortune of Zedekiah. The fifth chapter is a prayer for the Jews in their dispersion and captivity; and at the end of all, he speaks of the cruelty of the Edomites, who had insulted Jerusalem in her misery. The four first chapters of the lamentations are an abecedary, every verse or couplet beginning with one of the letters of the hebrew alphabet, in the alphabetical order. The subject is of the most moving kind, and the style throughout lively, pathetic, and affecting. "Did we ever find, says Dr. South, sorrow flowing forth in such a natural prevailing pathos, as in the Lamentations of Jeremy? One would think, that every letter was wrote with a tear; that every word was the noise of a breaking heart; that the author was a man compacted of sorrows, disciplined to grief from his infancy; one who never breathed but in sighs, nor spoke but in a groan."

LAMIA, in ichthyology, a name given to the white shark. See SHARK.

LAMIÆ, in heathen mythology, a kind of dæmons, in the form of women, said to have devoured children. See DÆMON.

LAMINÆ, in physiology, the thin plates whereof many substances consist.

LAMIODONTES, in natural history, the same.

same with the glossopetra. See the article GLOSSOPETRA.

LAMIUM, DEAD NETTLE, in botany, a genus of the didynamia gymnospermia class of plants, the flower of which consists of one labiated and ringent petal: the seeds are four, triangular, and contained in the bottom of the cup.

The flowers of this plant are said to be good in the fluor albus, dysentery, and scrophulous disorders. The herb is aperient, emollient, and vulnerary.

LAMMAS-DAY, a festival celebrated on the first of August by the romish church, in memory of St. Peter's imprisonment.

LAMP, *λαμπας*, a vessel containing oil, with a lighted wick. See the articles OIL, FLAME, FIRE, &c.

Dr. St. Clair, in Phil. Trans. n° 245, gives the description of an improvement upon the common lamp. He proposes that it should be made two or three inches deep, with a pipe coming from the bottom almost as high as the top of the vessel: let it be filled so high with water as to cover the hole of the pipe at the bottom, that the oil may not get in at the pipe, and so be lost. Then let the oil be poured in, so as to fill the vessel almost brim full, which must have a cover pierced with as many holes as there are wicks designed. When the vessel is thus filled, and the wicks are lighted, if water falls in by drops at the pipe, it will always keep the oil at the same height, or very near; the weight of the water being to that of the oil as $20\frac{8}{11}$ to 19, which in two or three inches makes no great difference. If the water runs faster than the oil wastes, it will only run over at the top of the pipe, and what does not run over will come under the oil, and keep it at the same height.

Rolling-LAMP, a machine A B (plate CLII. fig. 2.) with two moveable circles D E, F G, within it; whose common center of motion and gravity is at K, where their axis of motion cross one another. If the lamp K C, made pretty heavy and moveable about its axis H I, and whose center of gravity is at C, be fitted within the inner circle, the common center of gravity of the whole machine will fall between K and C; and by reason of the pivots A, B, D, E, H, I, will be always at liberty to descend: hence, though the whole machine be rolled along the ground, or moved in any manner, the flame will always be uppermost, and the oil cannot spill.

It is in this manner they hang the compasses at sea, and thus should all the moon-lanterns be made, that are carried before coaches, chaises, and the like.

LAMP BLACK, among colourmen. See the article BLACK.

LAMPADARY, an officer in the antient church of Constantinople, so called from his employment, which was to take care of the lamps, and to carry a taper before the emperor or patriarch when they went to church, or in procession.

LAMPAS, **LAMPERS**, or **LAMPRESS**, among farriers, a swelling and inflammation in the roof of a horse's mouth, so called because it is cured by burning with a lamp or hot iron, in which operation great care should be taken not to touch the bone.

LAMPERN, in ichthyology, a species of petromyzon, with a single row of little teeth in the verge of the mouth, beside the lower large ones. It grows to about a foot long, though most of those usually caught are under that standard. See the article PETROMYZON.

LAMPREY, *lampetra*, another species of petromyzon, with about twenty rows of teeth. It grows to two feet and an half, or more in length. It is caught in some large rivers near the sea, but is much less frequent than the former species.

LAMPSACUS, a port-town of the lesser Asia, at the entrance of the Propontis, opposite to Gallipoli, situated eighty miles south-west of Constantinople: east long. 28° , north lat. $40^{\circ} 12'$.

LANCASTER, the county-town of Lancashire: west long. $2^{\circ} 44'$, north lat. 54° . It sends two members to parliament.

LANCEOLATED LEAF, one resembling a spear's point.

LANCET, a chirurgical instrument, sharp-pointed, and two edged, chiefly used for opening veins in the operation of phlebotomy, or bleeding; also for laying open abscesses, tumours, &c.

A surgeon should never be without some of these of different sizes. See two represented in plate CLII. fig. 3.

LANCHANG, the capital of the kingdom of Laos, in the further India: east long. 101° , north lat. 20° .

LANCIANO, a city of Italy, in the kingdom of Naples, situated near the gulph of Venice: east long. $15^{\circ} 25'$, north lat. $42^{\circ} 20'$.

LAND, in a limited sense, denotes arable ground. See the articles EARTH, SOIL, HUSBANDRY, &c.

It is also used for meadow-ground, pasture, wood, commons, &c. See the articles MEADOW, PASTURE, &c.

LAND, in the sea-language, makes part of several compound terms; thus *land laid*, or to lay the land, is just to lose sight of it. *Land-locked*, is when land lies all round the ship, so that no point of the compass is open to the sea: if she is at anchor in such a place, she is said to ride land-locked, and is therefore concluded to ride safe from the violence of winds and tides. *Land mark*, any mountain, rock, steeple, tree, &c. that may serve to make the land known at sea. *Land is shut in*, a term used to signify that another point of land hinders the sight of that the ship came from. *Land to*, or the ship lies land to, that is, she is so far from shore that it can only be just discerned. *Land-turn*, is a wind that in almost all hot countries blows at certain times from the shore in the night. *To set the land*, that is, to see by the compass how it bears.

LANDAFF, a city and bishop's see of Glamorganshire, in south Wales, twenty-six miles north-west of Bristol: west long. $3^{\circ} 20'$, north lat. $51^{\circ} 33'$.

LANDAU, a city of Germany, in the circle of the Upper-Rhine, and landgravate of Alsace, situated fifteen miles south-west of Spire: east long. 8° , north lat. $49^{\circ} 12'$.

LANDEN, a small town of the austrian Netherlands, in the province of Brabant, eighteen miles south east of Louvain, and twenty miles north of Namur.

LANDGRAVE, the german name for a count or earl, that has the government of a province, country, or large tract of land.

LANDGRAVIATE, or **LANDGRAVATE**, the office, authority, jurisdiction, or territory of a landgrave.

LANDRECY, a town of the french Netherlands, in the province of Hainault: east long. $3^{\circ} 25'$, north lat. $50^{\circ} 3'$.

LANDSCROON, a port-town of Sweden, in the province of Gothland, and territory of Schonen, situated on the Baltic sea, within the Sound: east long. $14^{\circ} 20'$, north lat. $55^{\circ} 42'$.

LANDSHUT, a city of Germany, and the capital of Lower Bavaria, situated forty miles north-east of Munich: east long. $12^{\circ} 6'$, north lat. $48^{\circ} 30'$.

LANDSKIP, or **LANDSCAPE**, in painting, the view or prospect of a country, extended as far as the eye will reach.

Landskips are esteemed one of the lowest branches of painting, representing some rural scene, as hills, valleys, rivers, country-houses, &c. where human figures are only introduced as accidents.

In painting landskips the following rules will be found of use. 1. Always express a fair horizon, shewing the heavens cloudy or clear, more or less, according to the occasion; and if the sun is expressed at all, let it be either at rising or setting, and as it were behind or over some hill. The moon and stars are seldom or never depicted, unless in twilight-pieces, because all things are supposed to be seen by day. 2. Observe to make the sun's light reflect upon all the objects the same way, and the shadows to fall the contrary way. 3. Take care to augment or lessen things proportionally, as they are supposed to be nearer or farther from the eye. 4. In expressing things at large distances, as ten, twenty, or thirty miles off, where the object is hard to be discerned; as whether it be temple, castle, house, or the like, shew no particular signs thereof, or any eminent distinction, but rather as weakly, faintly, and confusedly, as the eye judges of it. 5. If landskips be laid in colours, the farther you go, the more you must lighten it with a thin and airy blue, to make it seem as if it were afar off, beginning at first with a dark green, so driving it by degrees into a blue, according to the distance. 6. Make your landskip to shoot, as it were, one part lower than another, making the nearest place or hill highest, and those that are farther off to shoot away under that, that the landskip may appear to be taken from the top of an hill. 7. Let every thing have its proper motion, as in trees when they are shaken with the wind, making the smaller boughs yielding, the stiffer less bending; in clouds, that they follow the winds; in rivers, the general current, and flashing of the waters against the boat-sides. 8. In the sea, the waves and other proper agitations, the rolling of the billows, the tumbling of vessels up and down, the ships floating, some dipt, some half drowned, some standing almost an end, some hid almost with the waves, by means of the uncertainty of the surges, others endeavouring to live. 9. In the motion of waters falling from an high place, but especially when they fall upon rocks and stones, you must represent it leaping up into the air, and sprink-

sprinkling all about: lastly, let every thing that moves, whether essentially or accidentally, have its proper representation. 10. Let the work imitate the season it is intended to represent; as if you intend it for a winter-piece, represent felling of woods, sliding upon the ice, fowling by night, hunting of bears or foxes in the snow, making the trees every where naked or laden with snow or a hoar frost; the earth bare, without greenness, flowers, or cattle; the air thick or heavy; the water frozen, with carts passing over it, and boys playing upon it, &c. 11. Lastly, let every site have its proper *parerga*, adjuncts or additional graces, as the farm-house, wind-mill, water-mill, woods, flocks of sheep, herds of cattle, pilgrims, ruins of temples, castles, and monuments, with a thousand such other things only proper to particular subjects.

LANDSPERG, the name of two towns in Germany; one situated on the river Warta, thirty-two miles north east of Frankfort upon the Oder; and the other, in Bavaria, twenty-three miles south of Augsburg.

LANERK, a parliament-town of Scotland, situated on the river Clyde, twenty miles south-east of Glasgow.

LANGEAC, a town of France, forty miles south of Clermont.

LANGLAND, an island of Denmark, situated in the streight called the Great Belt, between Zeland and Funen.

LANGREL SHOT, at sea, that consisting of two bars of iron, joined by a chain or shackle, and having half a ball of iron fixed on each end; by means of which apparatus, it does great execution among the enemy's rigging.

LANGRES, a great city of Champaign, the bishop of which is one of the twelve peers of France: east long. $5^{\circ} 22'$, and north lat. 48° .

LANGUAGE, a set of words which any people have agreed upon, whereby to communicate their thoughts to each other. Buffier observes, that the first principles of all languages may be reduced to expressions, signifying, first, the subject spoken of; secondly, the thing affirmed of it; and thirdly, the circumstances of the one and the other: but as each language has its peculiar ways of denoting each of these, a language is only to be looked on as an assemblage of expressions, which chance or caprice has established among a certain people. Hence we find,

that it is usage and custom that are the rules of a language; and these hold their empire independent of reason, or any other cause; nor has reason any thing to do in language, unless to study or teach it such as it is: here then commences grammar, a just plan of which supposes a language already introduced by use, and without pretending to alter or amend a tittle, only furnishes reflections called rules, to which the manners of speaking used in that language may be reduced: this assemblage of reflections is what we call the grammar of that language. See the articles **GRAMMAR** and **WORD**.

It is chance then to which we owe usage, and usage that makes the rules and measures of a language. Usage indeed is somewhat dubious, and may be divided into good and bad: the difference between the two being this, that the former is better established or authorized than the latter; and the difference of authority is no more, in the dead languages, than the writings of the best authors in that language; those being allowed the best authors in the language, who wrote when the state was in its greatest glory. Thus the age of Augustus being the most distinguished period in the roman history, we call that good latin which is conformable to the manners of speaking used by authors who wrote within fifty years before, or after the reign of that emperor. As to the living languages, the good usage, or mode, is that which obtains amongst the most eminent persons, whether as to quality and authority, or as to learning, and the reputation of writing well.

There is found a constant resemblance between the genius of each people, and the language they speak. Thus the Greeks, a polite but voluptuous people, had a language perfectly suitable, full of delicacy and sweetness. The Romans, who seemed only born to command, had a language noble, nervous, and august; and their descendants, the Italians, are sunk into softness and effeminacy, which is as easily perceivable in their language, as in their manners. The language of the Spaniards is full of that haughtiness which constitutes the distinguishing character of the people. The French, who have a world of vivacity, have a language that runs extremely brisk and lively. And the English who are naturally blunt, thoughtful, and of few words,

words, have a language exceeding short, concise, and sententious. See the articles GREEK, LATIN, ITALIAN, FRENCH, and ENGLISH.

The diversity of languages is generally allowed to have taken its rise from the confusion at the tower of Babel, both by Jews, Christians, and Manometans; but the manner in which this diversity was effected, is still in dispute among the learned.

As to the point of antiquity and priority among languages, that too has been extremely controverted. The Egyptians and Phrygians disputed concerning the antiquity of their languages: the Arabs dispute the point of antiquity with the Jews; but these, jealous even to excess of the honour of their nation, positively insist that the hebrew tongue, such as is found in the holy scriptures, is the primitive language, and that spoken by the first man; while others contend that the hebrew, chaldee, and arabic are only dialects of the original tongue. However that be, the arabic is held to be the most copious of all languages. See the articles CHALDEE, HEBREW, &c.

Languages are in general divided into original or mother tongues, as the hebrew and arabic in the east, the teutonic and slavonic in the west. See the articles SCLAVONIA and TEUTONIC.

Languages are also distinguished into dead or learned languages, and living languages; the former are those only which subsist in books, and which must be learned by the rules of grammar, as the greek, hebrew, syriac, and chaldee; and the latter are those still spoken in some country or other, and which may be learned by conversation; the most noted among these are the french, italian, spanish, and english.

LANGUED, in heraldry, expresses such animals whose tongue appearing out of the mouth, is borne of a different colour from that of the body.

LANGUEDOC, a province of France, bounded by Lioneis, on the north; by the river Rhone, which divides it from Dauphine and Provence, on the east; by the Mediterranean and the Pyrenees, on the south; and by Guienne and Gascony, on the west.

LANGUOR, among physicians, signifies great weakness and loss of strength, attended with a dejection of mind; so that the patients can scarce walk, or even stand upright, but are apt to faint away.

LANIERS, or LANNIERS. See LANNIERS.

LANIGEROUS, an appellation given to whatever bears wool. See WOOL.

Lanigerous trees are such as bear a woolly or downy substance, as in the catkins of the willows, &c.

LANIUS, the BUTCHER-BIRD, in ornithology, a species of falcon, with black legs, a grey back, and a variegated belly. See the article FALCON.

This is the smallest of all the birds of prey, used by falconers; being scarce equal to the black-bird in size.

LANNAR, or LANNERET, the blue-legged falcon, with oblong, black and white spots. It is a very beautiful bird, about the size of a common crow, very bold, and usually kept for the diversion of hawking. See the article HAWKING.

LANNIERS, or LANNIARDS, in a ship, are small ropes reeved into the dead man's eyes of all shrouds, either to slacken them or to set them taught: the stays of all masts are also set taught by lanners.

LANTANA, in botany, a genus of the didynamia angiospermia class of plants: the flower is monopetalous, with a plain and quinquefid limb: the fruit is a roundish unilocular drupe, which includes a bilocular nut, containing two oblong kernels.

LANTERLOO, or LOO, a game at cards, played several ways, whereof we shall only mention two.

The first way is this: lift for dealing, and the best put carries it: as many may play as the cards will permit; five being dealt to each, and then turning up trump. Now if three, four, five, or six play, they may lay out the threes, fours, fives, sixes, and sevens, to the intent they may not be quickly loosed; or, if they would have the loos come fast about, then they are to play with the whole pack.

Having dealt, set up five scores, or chinks. Then ask every one, beginning with the eldest in hand, whether they will play, or pass from the benefit of the game; and here it is to be observed, that the cards have the same values as in honours.

You may play upon every card what sum you please, from a penny to a pound; and if loosed, that is, win never a trick, you must lay down to the stock so much for your five cards, as you played upon every one of them. Every deal rub off a score, and for every trick you win set up a score, till the first scores are out; then counting your scores, or the numbers of the tricks you have won, you are to take

take from the stock in proportion to the value. A flush, or five cards of a suit looes all the other hands, and sweeps the board; and if there be two flushes, the eldest in hand hath the advantage: the knave of clubs, called paam, has this privilege, that he makes a suit with any other cards, and saves the person who has him from being looeed.

The other way is this: the dealer lays down so much for every card, as the company please to play for; and the cards being dealt, all must play; if any be looeed, they must each lay down so much as the cards are valued at, for their loo; and if the person next dealing be looeed, he must lay down double the said sum, viz. one for dealing, and the other for his loo. In case of a loo, the gamesters are asked, whether they will play, or not; beginning at the eldest hand; but if there is no loo, they must all play as at first; and this necessity, they justly call *force*.

If there be never a loo, the money may be divided by the gamesters, according to the number of their tricks, or left till one be looeed, as they shall judge proper.

LANTERN, or **LANTHORN**, a device to carry a candle in; being a kind of cover usually made of white iron, with sashes of some transparent matter, as glass, horn, &c. to transmit the light.

Dark LANTERN, one with only a single opening, which may also be closed up when the light is to be entirely hid; or opened, when there is occasion for the assistance of the light to discover some object.

Feast of LANTERNS, a chinese festival observed on the fifteenth day of the first month, when every chinese sets out a large lantern, illuminated with a great number of wax-candles. These lanterns are more or less splendid, in proportion to the circumstances of the owner: some of them are valued at ten thousand crowns, on account of the decorations bestowed on them; these are from twenty to thirty feet diameter, and serve as a kind of halls, in which they make sumptuous entertainments.

The chinese ascribe the rise of this festival to an unhappy accident which happened in the family of a certain mandarin, whose daughter, as she was walking one evening on the bank of a river, fell in and was drowned; on which her father, it is said, went in search of her with a great number of lanterns, and that the ceremony is annually kept up in re-

membrance of his daughter. Others ascribe it to an extravagant project of one of their emperors, who shut himself up with his concubines in a magnificent palace, which he illuminated with a great number of splendid lanterns; when the chinese, scandalized at his behaviour, demolished his palace and hung the lanterns all over the city.

Magic LANTERN, an optic machine, whereby little painted images are represented so much magnified, as to be accounted the effect of magic by the ignorant.

The contrivance is briefly this: **A B C D** (plate CLII. fig. 4.) is a tin-lantern, from whose side there proceeds a square tube *b n k l m c*, consisting of two parts; the outermost of which *n k l m* slides over the other, so as that the whole tube may be lengthened or shortened by that means. In the end of the arm *n k l m*, is fixed a convex glass *kl*: about *d e*, there is a contrivance for admitting and placing an object, *d e*, painted in dilute and transparent colours, on a plane thin glass; which object is there to be placed inverted. This is usually some ludicrous or frightful representation, the more to divert the spectators: *b b c* is a deep convex glass, placed in the other end of the prominent tube, the only use of which is to cast the light of the flame *a* strongly on the picture *d e*, painted on the plane thin glass. Hence, if the object *d e* be placed farther from the glass *kl* than its focus, it is manifest that the distinct image of the object will be projected by the glass *kl*, on the opposite white wall **F H**, at *f g*; and that in an erect posture: so that, in effect, this appearance of the magic lantern is the same with that of the camera obscura, or darkened room; since here the chamber **E F G H** is supposed quite dark, excepting the light in the lantern **A B C D**. See **CAMERA OBSCURA**. And here we may observe, that if the tube *b n k l m c* be contracted, and thereby the glass *kl* brought nearer the object *d e*, the representation *f g* shall be projected so much the larger, and so much the more distant from the glass *kl*; so that the smallest picture at *d e* may be projected at *f g*, in any greater proportion required, within due limits: whence it is, that this lantern got the name of *lanterna megalographica*. On the other hand, protracting the tube will diminish the object. Instead of the convex glass to heighten the light, some prefer a concave speculum, its focus being nearer than that of

a lens; and in this focus, they place the candle.

LANTERN, in architecture, a little dome raised over the roof of a building, to give light, and serve as a crowning to the fabric.

The term lantern is also used for a square cage of carpentry, placed over the ridge of a corridor, or gallery, between two rows of shops, to illumine them; like that of the Royal Exchange of London.

LANTERNISTS, a denomination assumed by the academicians of Tholouse.

LANUGO, the soft down of plants, like that growing on the fruit of the peach-tree; whence such plants are termed lanuginous.

LANZO, a town of Italy, in the territory of Piedmont, situated fifteen miles north of Turin.

LAODICEA, an antient city of the lesser Asia, situated east of Ephesus, now in ruins.

LAON, a city of France, in the province of the Isle of France, situated in east long. $3^{\circ} 45'$, lat. $49^{\circ} 37'$.

LAOS, a country of the farther India in Asia, bounded by China on the north; by Tonquin, on the east; by Siam and Cambodia, on the south; and by Ava and Pegu, on the west.

LAOTUNG, or **LEAOTUNG**. See the article **LEAOTUNG**.

LAPATHUM, the **DOCK**, in botany, is made by Linnæus, one genus with sorrel, and described under the name **rumex**. See the article **RUMEX**.

The oxylapathum-root is chiefly used externally for the itch, and other cutaneous foulnesses, made into an ointment with lard. Internally, it makes an excellent ingredient in diet-drinks and decoctions, intended against the scurvy, and all other diseases of the skin; for besides its aperient and attenuant quality, it is possessed of an astringency that renders it very valuable, whereby, after dislodging the viscid humours, it restores the tone of the parts.

LAPIDARY, an artificer, who cuts precious stones. See the article **GEM**.

The art of cutting precious stones is of great antiquity. The French, tho' they fell into it but lately, have notwithstanding carried this art to a very great perfection, but not in any degree superior to the English.

There are various machines employed in the cutting of precious stones, according to their quality: the diamond, which is extremely hard, is cut on a wheel of soft

steel, turned by a mill, with diamond-dust, tempered with olive-oil, which also serves to polish it.

The description of the diamond-cutters wheel or mill, as represented in plate CLII. fig. 5. is as follows: *a* is the pincers; *b*, the screw of the pincers; *c*, the shell that carries the mastic and the diamond; *d*, the mastic that softens the diamond at the end of the shell; *e*, the diamond presented to the wheel, to be cut facetwise; *f*, the iron-wheel turning on its pivot; *g*, iron-pegs, to fix and keep the pincers steady; *h*, small pigs of lead of different weights, wherewith the pincers are loaded at pleasure to keep them steady; *i*, a wooden wheel; *k*, the axe of the wheel. It is bended and makes an elbow under the wheel, to receive the impulsion of a bar that does the office of a turning handle; *l*, the sole or square piece of steel, wherein the pivot of the tree or axis moves; *m*, the turning handle, that sets the wheel a-going by means of the elbow of its axis. The elbow of the piercer wherewith a hog'shead is broached, will give an idea of this kind of motion; *n*, the catgut-string, that goes round both the iron and the wooden wheels. If the wooden wheel is twenty times larger than the iron-one, the latter shall make twenty turns upon the diamond, whilst the large wheel makes but one round its axis; and whilst the boy gives, without any resistance, a hundred impulsions to the turning handle, the diamond experiences a thousand times the friction of the whole grinding wheel.

The diamond-cutter follows the work with his eyes, without taking any other share in it than that of changing the place of the diamond to bite on a new surface; and of timely throwing upon it, with a few drops of oil, the minute particles of the diamond's first ground one against the other, to begin the cutting of them. The oriental ruby, sapphire, and topaz, are cut on a copper-wheel with diamond-dust, tempered with olive-oil, and are polished on another copper wheel with tripoli and water. The hyacinth, emerald, amethyst, garnets, agates, and other stones, not of an equal degree of hardness with the other, are cut on a leaden wheel with smalt and water, and polished on a tin-wheel with tripoli. The turquois of the old and new rock, girasol and opal, are cut and polished on a wooden wheel with tripoli also.

The lapidaries of Paris have been a corporation

Fig. 2. Rolling LAMP.

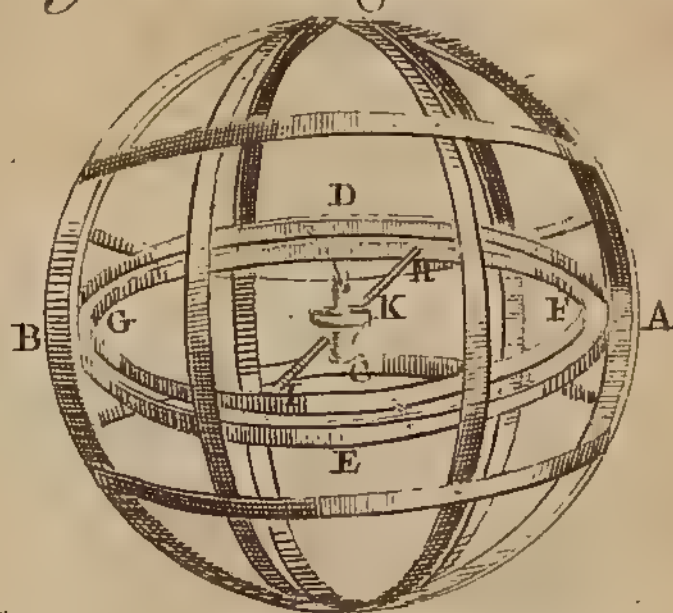


Fig. 1. LABEL.

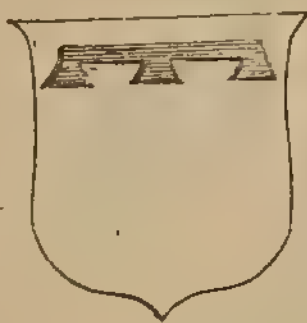


Fig. 3. LANCETS.

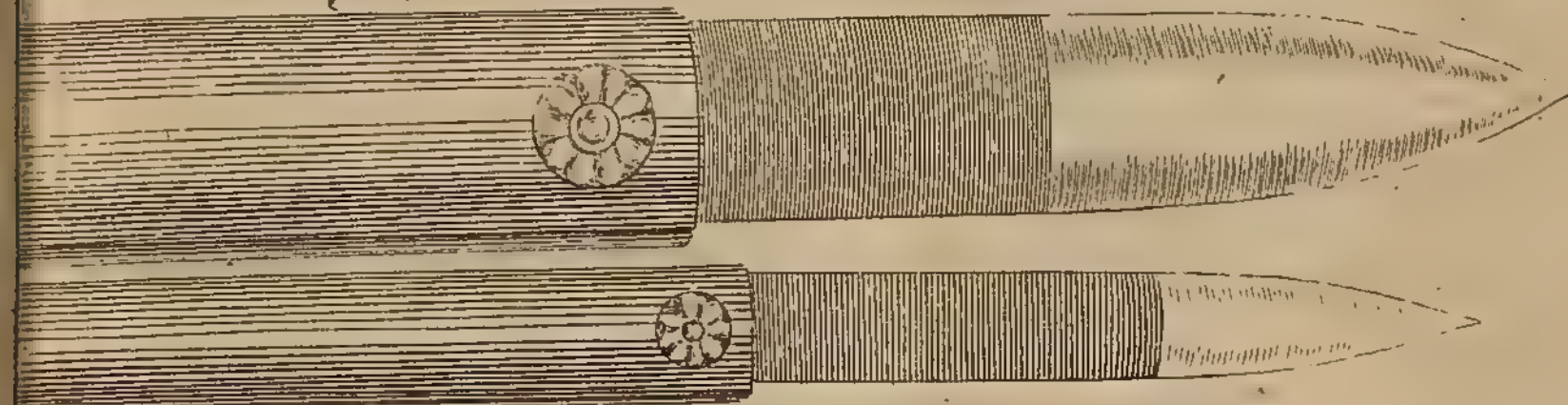


Fig. 4. MAGIC LANTHORN.

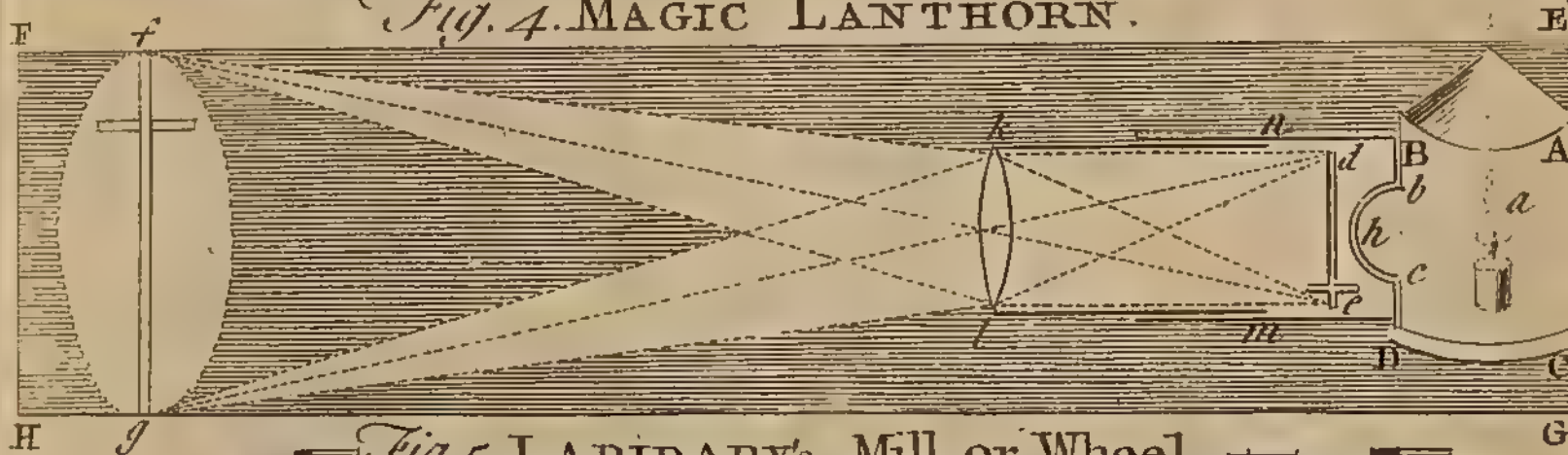


Fig. 5. LAPIDARY'S Mill or Wheel.





poration since the year 1290. It is governed by four jurats, who superintend their rights and privileges, visit the master-workmen, take care of the master-piece of workmanship, bind apprentices, and administer the freedom.

LAPIDARY is also used for a virtuoso skilled in the nature, kinds, &c. of precious stones, or a merchant who deals in them.

LAPIDARY-STYLE denotes the style proper for monumental or other inscriptions; being a sort of medium between prose and verse. The jejune and brilliant are here equally to be avoided. Cicero has prescribed the rules of this style. "Accedat, oportet oratio varia, vehemens, plena spiritus. Omnium sententiarum gravitate, omnium verborum ponderibus, est utendum."

The lapidary-style, which was lost with the antient monuments, has been retrieved at the beginning of this age by count Emanuel Tesoro. It is now used various ways, at the beginning of books; and even epistles dedicatory are composed in it, whereof we have no example among the antients. For an example of the manner of it among the greeks, see the article **EPITAPH**.

LAPIDESCENT, something that petrifies, or turns to stone. See the article **STONE**. The waters of many springs are impregnated with lapidescent particles of spar, wherewith bodies immersed in them being crufted over, are said to be petrified. See the article **PETRIFICATION**.

LAPIS, in general, is used to denote a stone of any kind. See **STONE**.

But besides this, its most common acceptation, the term lapis is applied by physicians, surgeons, and chymists, to several other substances, as well as different kinds of stone. 1. The lapis armenus, an ochre of copper, of a deep blue colour, is a violent emetic, the dose being from five to ten grains: it is one of the finest blues that nature furnishes for painting, and in oil makes a colour that will stand without alteration, almost as well as true ultra marine. The blue ochre of the shops, improperly called lapis armenus, is only a soft and friable earth. 2. Lapis bezoardicus fossilis, or fossile bezoar, is only the rough purple geodes, which contains in it a fine earth, said to be a very powerful sudorific, and a slight astringent. It is given in the small-pox and measles, and against the bites of venomous animals; the usual dose being from five grains to a scruple.

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3. Lapis calaminaris. See **CALAMINARIS**.

4. Lapis divinus. See **DIVINE STONE**.

5. Lapis galactites. See **GALACTITES**.

6. Lapis hæmatites. See **HÆMATITES**.

7. Lapis hibernicus, irish slate, a slate strongly impregnated with alum, and often containing a portion of vitriol; of a soft and more friable texture than any of the other stones of that class; of a dusky colour, and remarkably heavy.

It is given in powder as a styptic in all kinds of hæmorrhages, with success.

8. Lapis infernalis, the Lunar caustic, a preparation usually made from an evaporated solution of silver, but much better made from the crystals of silver in the following easy manner. See **CRYSTAL**.

Put the crystals of silver into a clean glass-vessel, set it over burning charcoal, and let the crystals melt: when no more smoke arises from the melted matter, pour it out of the glass into little cylindric cavities, formed in clay, or into any thing else that will give it an oblong form. As soon as the matter is cold, take it out of the mould, wrap it in some warmed paper, and dry it thoroughly in it; then wipe the surface, and put it into a clean and dry bottle, and cork it well up. It will keep thus many years.

It is a very powerful caustic, eating away the flesh, and even the bones it is applied to, only moistening the end of it first. 9. Lapis judæicus. See **JEW'S STONE**.

10. Lapis lazuli. See **LAZULI**.

11. Lapis melitites of the antients, an indurated clay, very heavy, of a pale white colour, with a faint cast of greyishness in it, variegated with spots, clouds, and veins of a pale yellow. It was antiently used in Egypt and Ethiopia: at present it is often met with in the german mines, and in the beds of several rivers both in France and Italy. The antients esteemed it as a vulnerary and narcotic. They ground it down into a thick liquor with water, and washed ulcers with it. They also gave it internally to people who were to suffer operations in surgery, in order to prevent their feeling the pain. At present it is little known in the world, and is used for no better purpose than that of marking in the manner of chalk. 12. Lapis morochthus of the antients, now called french chalk, is much the same kind with the former indurated clay, but more fine; being extremely dense, smooth, and glossy, when rubbed: the antients had it as well as the former from Egypt and Ethiopia,

Ethiopia, but the world is now supplied with it from France, where it is in great abundance: the antients esteemed it an astringent and lithontriptic: they also used a collyrium made of it in disorders of the eyes and eye-lids: however, at present we know nothing of it, but that it seems to take spots out of clothes better than fullers-earth, and that it marks better than chalk. 13. Lapis nephriticus, nephritic stone, a species of jasper. See JASPER. It is found on the surface of the earth, and in the beds of rivers in many parts of America; it is pretended to have prodigious virtues as a diuretic, and to exert them in their full force on being worn externally. The Indians wear it also as a gem cut into various forms, and hung to their lips. 14. Lapis selenites, or moon-stone; that species of the selenites used in medicine is the common thin pellucid rhomboidal kind. See SELENITÆ. This is a beautiful fossil, perfectly pure from any extraneous mixtures, of a regular and determinate figure like that of the crystals of blue vitriol: it is of various sizes, from one tenth of an inch in diameter, to six or more inches. It is found in strata of clay, usually of the blue tough kind. It is a powerful astringent, and is of great effect in diarrhœas, dysenteries, and hæmorrhages of all kinds. It is not much known in the shops, tho' it stands in most books on the materia medica. 15. Lapis specularis, muscovy-talc, or isinglass, a fossil well known for its many uses, though the principal of these are not of the medicinal kind: it is one of the purest and simplest of the natural bodies, and more than almost any thing that we know resists the force of menstruums, and even of fire. It is composed of a multitude of extremely thin pellucid and beautiful plates, or flakes of great extent, each usually making the whole surface of the mass. It is found in great abundance in Muscovy and Persia, and in many mountains in Germany. There are some who recommend it in powder for epilepsies. It is used in many of the arts and manufactures: the antients made their windows of it instead of glass: at present our miniature-painters sometimes use it before their pictures instead of glass: it is also often used instead of horn for lanterns; and the minute bodies intended for microscopic observation are preserved between plates of it. 16. Lapis thyites of Dio-

scorides, is an elegant and beautiful substance of the nature of those bodies already mentioned, under the name of lapis melitites, and lapis morochthus; the antients used it in distemperatures of the eyes, as they did the melitites.

LAPIS AMPELITES. See AMPELITES.

LAPIS OBSIDIANUS, or the obsidian stone, or chian marble, of the antients, the dull, smooth, hard, black marble. See the article MARBLE.

LAPLAND, the most northerly part of Europe, divided into Norwegian Lapland, Swedish Lapland, and Russian Lapland: it lies between 10 and 35° of east long. and between 65 and 72° of north lat.

LAPSA, denotes a patron's neglect or omission to present to a church within six months after it becomes vacant. When after a vacancy the patron does not present in six months, the ordinary has the next six months to collate to the benefice; and if he does not present within that time, the metropolitan has farther six months to do it in; and if he should fail in doing it in his time, the next six months devolves to the crown.

LAPSANA, STELLATED HAWK-WEED, in botany, a plant of the syngenesia-polygamia-æqualis class, the compound flower of which is imbricated with about sixteen equal and uniform hermaphrodite corollulæ; the partial corolla is monopetalous, ligulated, truncated, and quinque-dentated; there is no pericarpium; the seed is single, oblong, and cylindrically trigonal; the receptacle is naked and plain.

This genus comprehends the lampfana, hedypnois, zacantha, and rhagadiolus or rhagadioloides of authors. In the lampfana the seeds are all naked, not surrounded by the squamæ of the cup. In the rhagadiolus, every squama of the cup incloses a single seed. In the zacantha, the marginal seeds are each surrounded by a squama of the cup, and the central ones are coronated with a short simple down. In the hedypnois the marginal seeds are each surrounded in a squama of the cup, and the central ones are coronated with a cup divided into five denticles.

LAPWING, *vanellus*, in ornithology. See the article VANELLUS.

LAQUEUS, in surgery, a kind of ligature so contrived, that when stretched by any weight, or the like, it draws up close. Its use is to extend broken or disjointed bones,

bones, to keep them in their places when they are set, and to bind the parts close together. See **EXTENSION**, &c.

LAR, in geography, a city of Persia, in the province of Fars; situated 360 miles south east of Ispahan, in east long 54° north lat. $28^{\circ} 15'$.

LAR-BOARD, among seamen, the left hand side of the ship, when you stand with your face towards the head.

LARGENY, in law, a felonious carrying away another person's goods; and this according to the value of the thing stolen, is either grand, or petit larceny; the first being stealing effects above the value of 1s. and the last such as are either of that value, or under it: but where two persons together steal goods to the value of only 13 d. it is grand larceny in both: and if one person at different times steal several different things from the same person, which amount upon the whole to above 12 d. value, they may be joined in one indictment, and the offender found guilty of grand larceny; but this is very seldom practised; on the contrary, the jury, where the theft appears to be the first offence, frequently bring in their verdict, as they lawfully may, that the things are not above 10 d. value, and by that means reduce the offence to petit larceny, though the offender may perhaps be indicted for stealing to the value of 30 or 40 s. and upwards. The crime of grand larceny is punishable with death, and that of petit larceny, only with the corporal punishment of whipping, &c.

Larceny has been also divided into simple larceny by taking away the goods of another; mixed, or complicated larceny, which has a further degree of guilt, as in cases of robbery, &c. private larceny, where the felonious taking from a person above the value of 12 d. is felony without benefit of clergy, if it be only laid in the indictment that it was done privately and secretly. And lastly, open larceny, or such as is committed with the party's knowledge, as where a thief snatches off a person's hat, and runs away with it; this is within the benefit of the clergy. A person may commit larceny, by taking away his own goods in the hands of another; as where the owner delivers goods to a carrier, or any other person, and afterwards secretly steals them, with an intent to charge him for them. If a person employs a child of six or seven years of age to take goods and bring them to him, and he carries them away, the child is not

guilty of this crime on account of his infancy, but it is larceny in the other.

LAREDO, a port town of Spain, in the province of Biscay, situated on the coast of Biscay: west lon. $3^{\circ} 40'$, north lat. $43^{\circ} 30'$.

LARES, certain inferior deities among the antient Romans, who were the guardians of houses; they were also sometimes taken for the guardians of streets and ways, and Tibullus makes them the guardians of the fields. According to Ovid, they were the sons of Mercury and Lara, whose tongue was cut out by Jupiter, because she revealed his adulteries to Juno; and not contented with this, he delivered her to Mercury, with orders to conduct her to hell; but he falling in love with her by the way, had twins by her, who from their mother were called lares.

These domestic deities were sometimes represented under the figure of a dog, the symbol of fidelity; because dogs have the same function as the lares, which is to guard the house. At other times their images were covered with the skin of a dog, and had the figure of that domestic animal standing by them. The principal sacrifices to the lares, were incense, fruit, and a hog.

The Romans had a private place in their houses, called *lararium*, in which, among other statues of their gods, were their lares, and the images of their ancestors. Tertullian tells us, that the custom of worshipping the lares arose from their antiently interring their dead in their houses; whence the credulous people took occasion to imagine, that their souls continued there likewise, and thence proceeded to pay them divine honours. To which may be added, that the custom of burying them in the highways might occasion their being considered likewise as gods of the highways.

LARGE, in the manege, a horse is said to go large and wide, when he takes in a great deal of ground, by going wide of the center of the volt, and describing a great circumference.

LARGO, in the Italian music, a slow movement, one degree quicker than the grave, and two than the adagio. See the articles **ADAGIO** and **GRAVE**.

LARINA, a town of Italy, in the kingdom of Naples, and province of Molise: east long. $15^{\circ} 45'$, north lat. $41^{\circ} 50'$.

LARISSA, a city of European Turkey in the province of Thessaly, situated on the river Peneus: east long. $23^{\circ} 30'$, north lat. 39° .

LARIX, the **LARCH-TREE**, a species of *Pinus*. See the article **PINUS**.

LARK, *alauda*, in ornithology. See the article **ALAUDA**.

To this genus belong, 1. The sky-lark, with the long wing-feathers, variegated with white and brown. 2. The tit-lark, with a white line over the eyes. 3. The wood-lark, with the wings obliquely variegated with white. 4. The yellow-breasted lark. 5. The snow-bird, or pied chaffinch, with the tail-feathers black, except the three lateral ones, which are white.

Sea-LARK, the english name of a species of *charadrius*, with a black front and a white line on it. See **CHARADRIUS**.

LARK-SPUR, *delphinium*, in botany. See the article **DELPHINIUM**.

LARMIER, in architecture, a flat, square, massive member of the cornice, between the cymatium and ovolo, and jetting out farthest; it is so called from its use, which is to disperse the water, and cause it to fall at a distance from the wall, drop by drop, or as it were by tears; *larme*, in french, signifying a tear. It is otherwise called *corona*. See **CORNICHE**.

LARTA, a port-town of european Turkey, in the province of Epirus or Janna, situated at the entrance of the gulph of Venice: east long. $21^{\circ} 15'$, north lat. 39° .

LARUS, the **GULL**, in ornithology, a genus of the anseres-order of birds, thus characterized: the beak is straight all the way, except just at the point, where it turns down; add to this, that it is obtuse, not denticulated along the sides, and its lower chap gibbous or protuberant underneath.

To this genus belong, 1. The white gull with a hoary back, about the size of a well-grown pullet. 2. The great grey gull, or white larus with a greyish-brown back, and somewhat larger than the first species. 3. The less gull, or sea-mall with a grey back and spotted neck, about the size of a common tame pigeon. 4. The brownish-grey sea-mall, as large as the first species. 5. The torrock, or larus with a white head and a black spot on each side. 6. The peewit or black cap, so called from its black head; it is about the size of the third species. With several other species, distinguished in the same manner.

LARYNGOTOMY, or **BRONCHOTOMY**. See the article **BRONCHOTOMY**.

LARYNX, the thick upper part of the *aspera arteria*, or wind-pipe. The la-

ryn timer is principally composed of five cartilages: the first is the thyroide or scutiform cartilage, which is of a kind of quadrangular figure, and stands in the anterior part; this is the largest of the five; the second is the cricoide or annular one; this occupies the lowest part, by way of base to the rest; and to the lowest part of this, what is properly called the *aspera arteria* adheres: the third and fourth are the two arytænoide ones; these form, as it were, a kind of basin of a singular figure, which is joined to the posterior and superior parts of the cricoides, by peculiar articulations on each side, that the glottis may be more easily opened and contracted: the fifth is the epiglottis. See **GLOTTIS**, **EPIGLOTTIS**, &c.

The membrane which invests the larynx, is very sensible, and is furnished with a number of oscula or openings, which discharge a lubricating fluid. There are also glands extended over each surface of it, which serve for secreting a mucous fluid, for lubricating the whole *aspera arteria*. The ventricles of the larynx are certain hollows, some of them smaller and some larger; they are on the inside of it, under the glottis, and serve to modulate the voice.

LASERPITIUM, **LASER-WORT**, a genus of the pentandria-digynia class of plants, the general corolla whereof is uniform; the partial one consists of five nearly equal petals, inflexo-cordated at the ends; there is no pericarpium; the fruit is oblong and separable into two parts, and is ridged with eight longitudinal membranes; the seeds are two, very large, oblong, and semi-cylindric, plane on the one side, but on the other ornamented on the back and edges with four membranes.

The root of laser-wort is said to be good in the sciatica, and for healing strumæ and other excrescences.

LASH, or **LACE**, in the sea-language, signifies to bind and make fast; as, to lash the bonnet to the course, or the drabber to the bonnets: also the carpenter takes care that the spare yards be lashed fast to the ship's side; and in a rolling sea, the gunners mind that the guns be well lashed, lest they should break loose. Lashers are properly those ropes which bind fast the tackles and the breechings of the ordnance, when haled or made fast within-board.

LASKETS, small lines, like loops, sewed to the bonnets and drabblers of a ship, to lash

lash or lace the bonnets to the courses, or the drablers to the bonnets.

LASKING, at sea, is much the same with going large, or veering, that is going with a quarterly wind. See **VEER**.

LASSITUDE, or **WEARINESS**, *ῥοπή*, in medicine, a morbid sensation, that comes on spontaneously, without any previous motion, exercise, or labour. This is a frequent symptom in acute distempers: it arises either from an increase of bulk, a diminution of proper evacuation, or too great a consumption of the fluids necessary to maintain the spring of the solids, or from a vitiated secretion of that juice.

The remedy in the first case is evacuations; and in the other a proper diet, or such alterative medicines as influence such a secretion. See the articles **EVA-
CUATION** and **SECRETION**.

LAST, in general, signifies the burden or load of a ship.

It signifies also a certain measure of fish, corn, wool, leather, &c. A last of cod-fish, white herrings, meal, and ashes for soap, is twelve barrels; of corn or rape-seed, ten quarters; of gun-powder, twenty-four barrels; of red-herrings, twenty cades; of hides, twelve dozen; of leather, twenty dickers; of pitch and tar, fourteen barrels; of wool, twelve sacks; of stock-fish, one thousand; of flax or feathers, 1700 lb.

LAST, in the marshes of Kent, is applied to a court held by the twenty-four jurors, in which orders are given for the imposing and levying of taxes, for preserving the said marshes.

LAST-HEIR, in law, he to whom lands come by escheat, for want of lawful heirs; who, in many cases, is the lord whereof they are held, but in others the king.

LASTAGE, or **LESTAGE**, as defined by Rastal, a duty exacted in some fairs and markets, for carrying things bought, whither one will; but, according to another author, it is the custom paid for wares sold by the last. It signifies also the ballast or lading of a ship; and sometimes is used for garbage, rubbish, or such like filth.

LATEN, or **LATTEN**. See **LATTEN**.

LATERAL EQUATION, in algebra, a simple equation, whose root is only in one dimension. See **EQUATION**.

LATERAN COUNCILS, those councils held in the basilica of the Latin church at Rome. See the article **COUNCIL**.

There have been five councils held in this

place, *viz.* in the years 1123, 1139, 1179, 1215, and 1513.

Canons regular of the congregation of the **LATERAN**, were introduced in the time of pope Leo I. and continued in the church till the reign of Boniface, who displaced them, and put secular canons in their room; but one hundred and fifty years after, the regulars were reinstated again.

A **LATERE**, a term used to denote the qualifications of cardinals whom the pope sends as legates into foreign courts, who are called legates *a latere*, as being his holiness's assistants and counsellors in ordinary; these are the most considerable of the three other legates, being such as the pope commissions to take his place in councils, and so called in regard that he never gives this office to any but his favourites and confidants, who are always *a latere*, at his side. A legate *a latere* has the power of conferring benefices without a mandate, of legitimating bastards, to hold offices, and has a cross carried before him, as the ensign of his authority.

De **LATERE**, legates who are not cardinals, but yet are entrusted with an apostolical legation. See the article **LEGATE**.

LATH, in building, a long, thin and narrow slip of wood, nailed to the rafters of a roof or ceiling, in order to sustain the covering.

These are distinguished into three kinds, according to the different kinds of wood of which they are made, *viz.* heart of oak, sap-laths, and deal laths; of which the two last are used for ceilings and partitions, and the first for tiling only. Laths are also distinguished according to their length, into five-feet, four-feet, and three-feet-laths, though the statute allows but of two lengths, those of five, and those of three feet, each of which ought to be an inch and a half in breadth, and half an inch in thickness, but they are commonly less.

Of cleaving **LATHS**. The lath-cleavers having cut their timbers into lengths, they cleave each piece with wedges, into eight, twelve, or sixteen, according to the size of their timber; these pieces are called bolts: this is done by the felt-grain, which is that grain which is seen to run round in rings at the end of a piece of a tree. Thus they are cut out for the breadth of the laths, and this work is called felting. Afterwards they cleave the laths into their proper thicknesses with their

their chit, by the quarter-grain, which is that which runs in straight lines towards the pith. See the article GRAIN.

LATH-BRICKS, bricks much longer than ordinary, used instead of laths, for drying malt; for which purpose they are extremely proper, as not being liable to catch fire, and retaining the heat much longer than those of wood; so that a very small fire will serve, after they are once heated. See BRICK and MALT.

LATHE, in turning, is an engine used in turning wood, ivory, and other materials. See plate CLIII. fig. 1. n^o 1. It is composed of two legs or styles, *a a*, which are commonly about two feet ten inches high, on the upper part of which are fastened two pieces of wood called cheeks, *b, b*, parallel to the horizon; between these are two pieces of wood, called puppets, *c, c*, made to slide between the cheeks, and to be fixed down at any point at pleasure; near the upper end of one of these puppets is fastened a strong spike of tempered steel, *d*, and opposite to it, in the other, is an iron-screw *f*; by these the piece to be turned is sustained, and is turned round by means of the string *m*, put round it, and fastened above to the pliable pole *l*, and underneath to the treddle or board, *i*, moved with the foot: there is also a piece of wood between the cheeks, called a rest, *e*, whose office is to rest the tool upon, that it may lie in a steady position while the workman uses it.

When turners perform heavy work (which the pole and treddle will not command) they use instead of these a wheel (*ibid.* n^o 2.) which is turned about sometimes with one, and sometimes with two handles, according to the weight of the work; its string hath both its ends neatly fastened together, and this being fixed in a groove round the edge of the wheel, and after being crossed, put round a groove in the work, it is easily turned round with a swift and regular motion. This is the most expeditious method of working; for the springing up of the pole makes an intermission in the turning of the work, but with the wheel it always turns the same way, so that the tool need never be taken off, unless it be to examine the work as it is doing.

Braziers, who turn pots, kettles, &c. have their lathe made in a different manner from that used by turners, as may be seen in plate CLIII. fig. 2.

The puppets and rests are much stronger than those used by the turners: their

edge-tools, which they call hooks, are also of a different shape from the chissels and other tools used by turners, as may be seen *ibid.* marked B 1, B 2, B 3, being bent backwards and forwards at the cutting end. And as the common turners work with a round string made of gut, the braziers work with a flat leather-thong, which wrapping close and tight about the rowler of their mandril, commands it with the greater ease, and turns it more forcibly about.

Small work in metal is turned in an iron-lathe, called a turn-bench, represented in plate CLIII. fig. 3. When this is used, it is fixed in the chaps of a vice, and the work being fitted on a small iron-axis, with a drill-barrel fitted upon a square shank near the end of it, the workman turns it round with a drill bow, which he holds in his left hand, while he forms the moulding with a graver or other tool, which he holds in his right.

In turning oval or rose-work, the common turner's lathe must be provided with the additional parts represented in plate CLIV. fig. 1. which represents the whole machine with all its parts ready for working, A being the fore-puppet, with its apparatus; B, the hinder puppet; C, a hollow axis, turned into a screw-fashion, to direct the weight D, by means of the nut E; and F, the support of the tools, which may be raised or lowered at pleasure.

LATHE, or **LETH**, as used in Kent and Sussex, is part of a county, containing three or four hundreds.

LATHRÆA, GREAT TOOTH-WORT, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof consists of a single petal; the tube is longer than the cup; the limb is ringent and-ventricose; the upper-lip is concave, galeated, and broad, with a narrow crooked apex; the inferior one is less, and is reflex, obtuse, and trifid; the fruit is a roundish elastic capsule, consisting of two valves, and containing only one cell; it is covered with a very large patent cup; the seeds are few and roundish.

LATHYRUS, CHICKLING PEA, in botany, a genus of the diadelphia-decandria class of plants, the corolla of which is papilionaceous; the fruit is a very long, cylindric or compressed, acuminate pod, consisting of two valves; the seeds are numerous, of a cylindric, globose, or somewhat angular figure. See plate CLIV. fig. 2. and the article APHACA.

LATIAR FESTIVAL, in roman antiquity,

Fig. 1. Turner's LATHE & WHEEL.

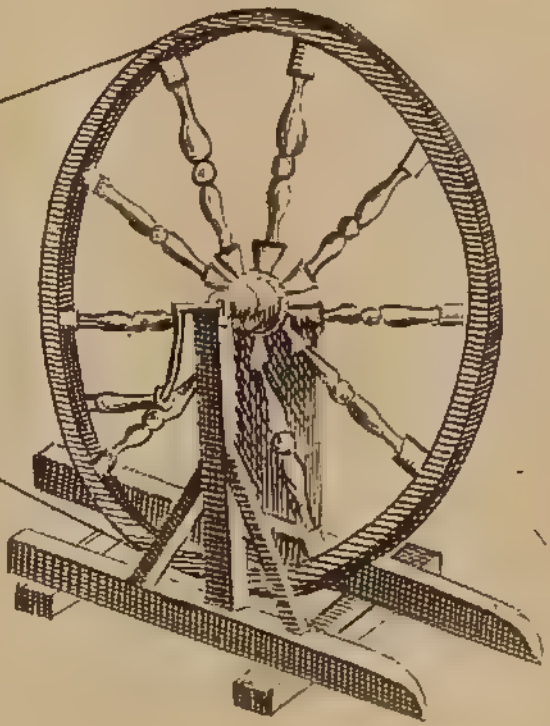
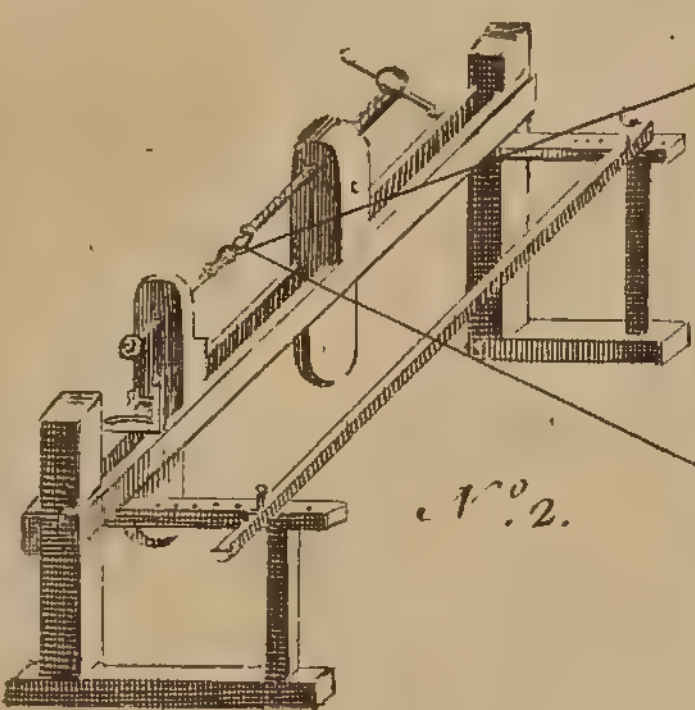
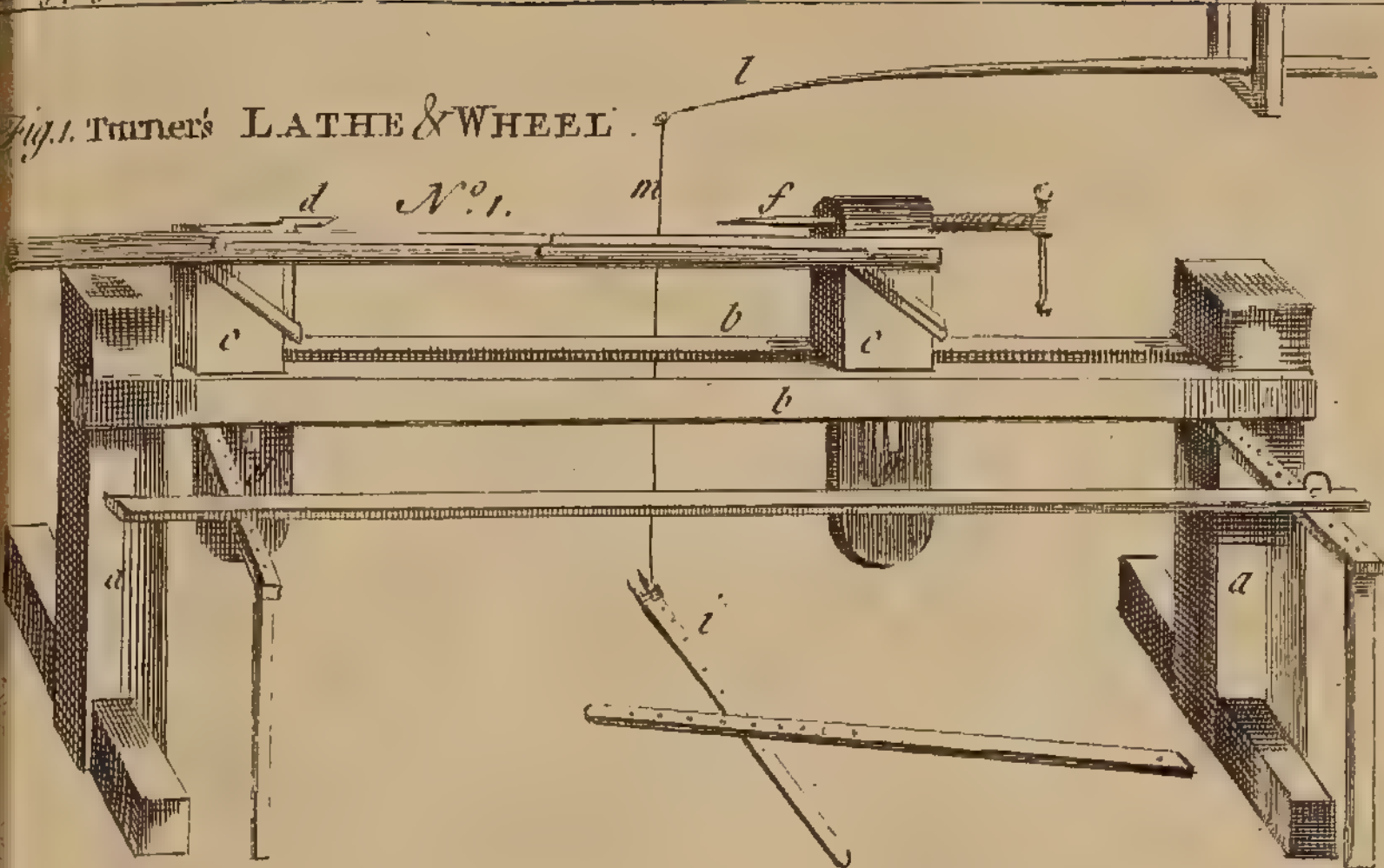


Fig. 3. An IRON-LATHE.
for turning small Work in Metall.

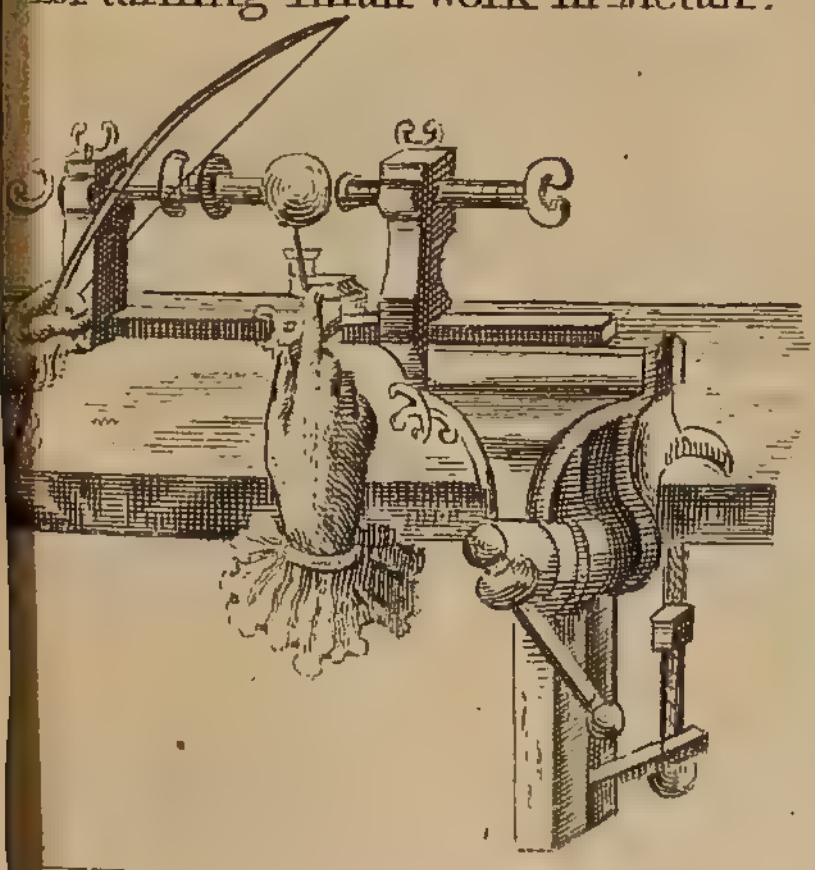
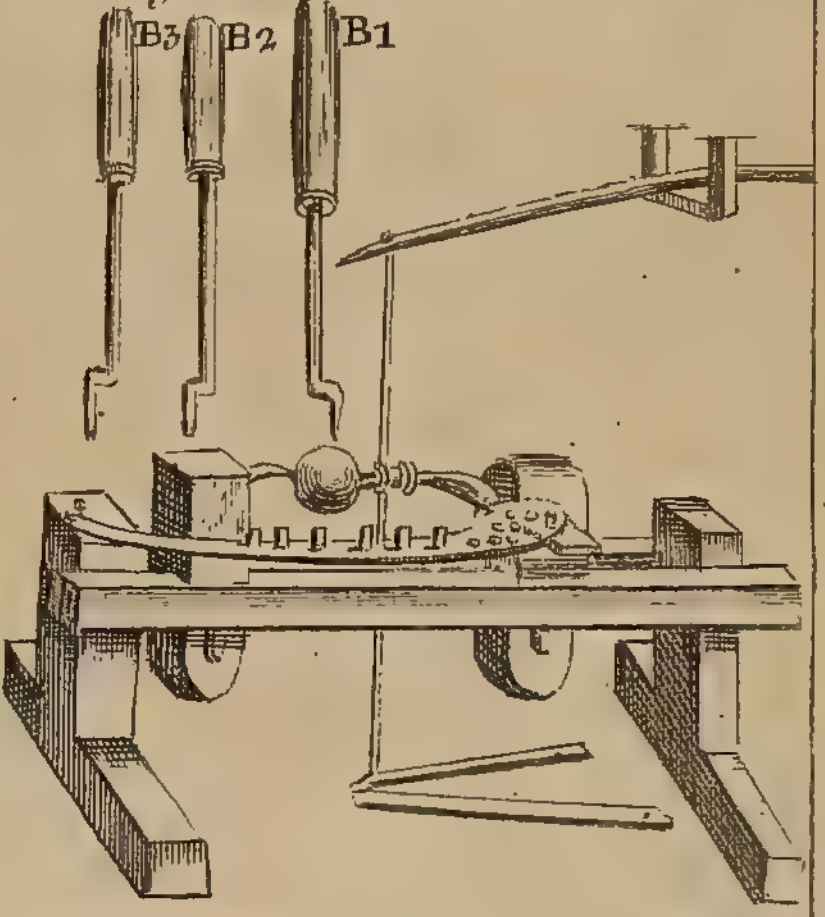


Fig. 2. BRASIERS-LATHE.



J. G. Jefferys sculp

Fig. 1. L A T H E for turning
Oval and Rose-Work.

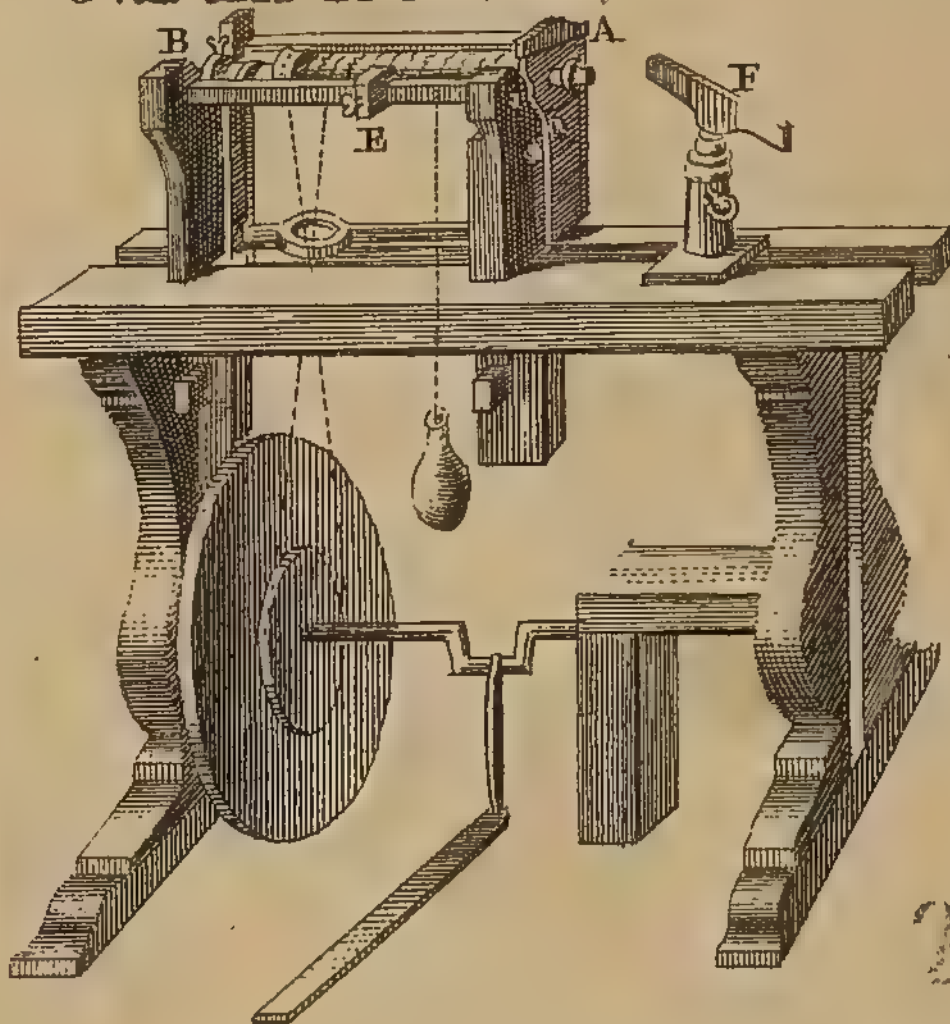
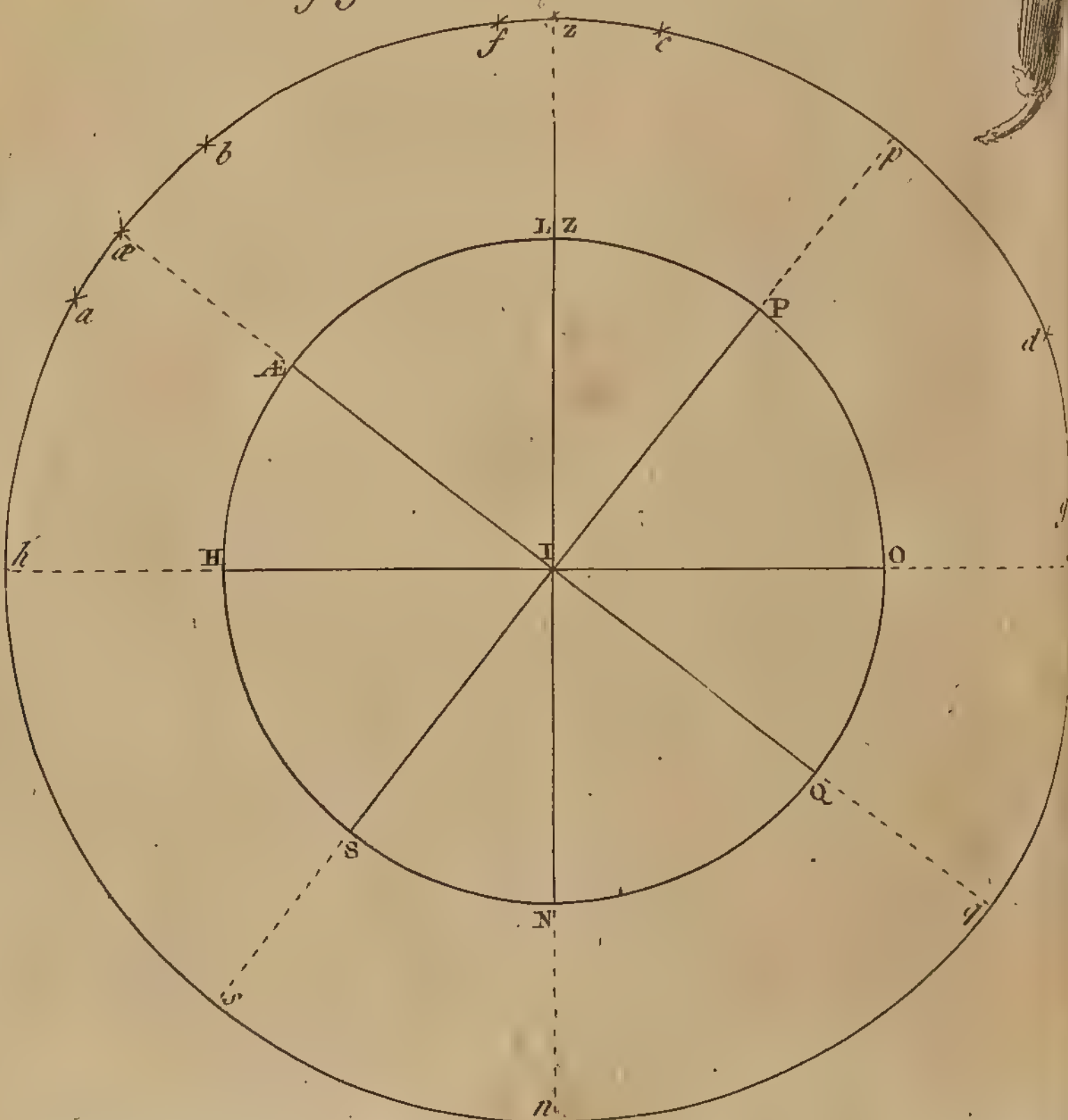


Fig. 2. L A T H Y R U S.



Fig. 3. L A T I T U D E.



ty, the same with the latin feriæ. See the article FERIE LATINÆ.

LATICLAVIUM, or LATUS CLAVUS, in the roman antiquity. See the article CLAVUS.

LATIN, a dead language, first spoken in Latium, and afterwards at Rome; and still used in the romish church, and among many of the learned.

This language is principally derived from the greek, and particularly from the eolic dialect of that tongue, though it has a great number of words which it borrowed from the language of the Etrusci, Osci, and other antient people of Italy; and foreign commerce and wars, in course of time, added a great many more.

The latin is a strong nervous language, perfectly suitable to the character of the people who spoke it; we have still works of every kind, admirably well written in the latin, though there are vast numbers lost. The latin is more figurative than the english, more harmonious than the french, less copious than the greek, less pompous than the spanish, less delicate than the italian, but closer and more nervous than any of them.

The latin tongue was for a while confined almost wholly within the walls of Rome; nor would the Romans allow the common use of it to their neighbours, or to the nations they subdued: but, by degrees they in time became sensible of the necessity of its being generally understood for the conveniency of commerce; and accordingly used their endeavours that all the nations subject to their empire, should be united by one common language, so that at length they imposed the use of it, by a particular law for that purpose. After the translation of the seat of the empire from Rome to Constantinople, the emperors of the east being always desirous of retaining the title of roman emperors, appointed the latin to be still used; but at length neglecting the empire of the west, they abandoned all care of the latin tongue, and used the greek. Charlemagne coming to the empire of the west, revived this language; but at length it gave way, and the french took place of the latin: it was, however, prodigiously degenerated before it came to be laid aside, in which condition it was found at the time of the reformation, when Vives, Erasmus, &c. began to open the way for its recovery: since which time the monkish latinity has been declining, and all endeavours have been used to

retrieve the pure language of the augustan age. See the article LANGUAGE.

LATIN CHURCH. See CHURCH.

LATIN BIBLE. See the article BIBLE.

LATISSMUS, in anatomy, a large muscle of the back, so called from its great breadth. See the article DORSUM.

LATITAT, a writ which issues out of the king's bench, so denominated from a supposition that the defendant lies lurking and concealed, after having fled out of Middlesex, into some other county; to the sheriff whereof this writ is directed, commanding him to apprehend the defendant there.

LATITUDE, *latitudo*, in geography, is the distance of any place from the equator, measured in degrees, minutes, and seconds, upon the meridian of that place; and is either north or south, according as the place is situated either on the north or south side of the equator: thus, let L (plate CLIV. fig. 3.) represent London, P the north pole, ÆQ the equator; then will P L ÆQ be the meridian of London, and the arch ÆL the latitude of London; which being equal to $51^{\circ} 32'$, it is said to be $51^{\circ} 32'$ north. See EQUATOR.

The latitude of a place is always equal to the elevation of the pole above the horizon: thus, L Æ , the latitude of London, is equal to the arch P O, the elevation of the pole P, above the horizon H O.

The complement of latitude is always equal to the elevation of the equator above the horizon, or the angle intercepted between the plane of the equator and the plane of the horizon: thus, the complement of the arch ÆL , the latitude of London, is ÆH , which measures the elevation of the equator ÆQ , above the horizon H O, or the angle ÆIH intercepted between the planes of the equator and horizon, being $38^{\circ} 28'$, which added to $51^{\circ} 32'$, is equal to 90° . See the article COMPLEMENT.

The latitude of a place, or of a ship at sea, is found by taking the meridian altitude of the sun, or of a star whose declination is known. This problem admits of several cases, which are these: 1. When the sun or star has no declination, or is upon the equator, at α (plate CLIV. fig. 3.) then the zenith-distance of the object αz , is equal to the latitude of the place, which is north latitude, if the sun or star come to the meridian of the south side of the zenith; and south latitude, if on the north side. 2. If the sun or star, when on the meridian, is in the zenith

at

at z ; then the declination of the object az , is equal to the latitude of the place; consequently, if the declination be north, the latitude will also be north; and if south, south. 3. If the sun or star be between the equator and zenith, as at b ; then the latitude of the place is equal to the sum of the zenith-distance and declination of the obj. that is, latitude $= zb + ba$: and it is of the same name with the declination, viz. north or south, according as the declination is north or south. 4. If the sun or star be on the contrary side the equator, as at a , and consequently the declination and zenith-distance of the same name, viz. either both north or both south; then the latitude is found by subtracting the declination from the zenith-distance; that is, latitude $= az - a\alpha$: and it is of a contrary name with the declination. 5. If the sun or star be between the zenith and the nearest pole, as at c , and consequently both declination and zenith-distance be of the same name; then from the declination subtract the zenith-distance, and the remainder will be the latitude; that is, latitude $= ca - cz$. 6. If the sun or star be between the horizon and the elevated pole, as at d ; then to the altitude add the complement of the declination, and the sum $do + dp$ will be the latitude. 7. When the observed object does not set, as at c and d , and consequently the complement of its declination less than the latitude of the place; then the latitude may be found by observing both the meridian altitudes, viz. the greatest at c or f , and the least at d or g , without knowing the declination of the object; for if both the altitudes be on the same side of the zenith, as at c and d ; then from the greatest subtract the least, and half the remainder added to the least, gives the latitude; that is, $co - do = cd$, and $\frac{cd}{2}$

$(=pd) + do = \text{latitude}$. But if the greatest and least meridian-altitudes of the object be upon different sides of the zenith, as at f and g , then from the supplement of the greatest altitude subtract the least, and half the remainder added to the least altitude, will give the latitude; that is, $fo - go = fg$, and $\frac{fg}{2} (=pg) + go = \text{latitude}$.

The latitudes of the several cities, towns, and other places of note on the globe, may be seen ranged each under its proper head, throughout the course of this work.

LATITUDE, in astronomy, the distance of a star or planet from the ecliptic, in degrees, minutes, and seconds, measured on a circle of latitude drawn through that star or planet, being either north or south, as the object is situated either on the north or south side of the ecliptic. See the articles **ECLIPTIC** and **CIRCLE of latitude**. The ecliptic being drawn on the common celestial globes, we may see what constellations it passes through: there are usually six circles of latitude, which by their mutual interfections, shew the poles of the ecliptic, as well as divide it into twelve equal parts, answerable to the number of months in a year. Fig. 1. of plate CLV. represents a celestial globe, where AG is the ecliptic, N the north, S the south pole of the ecliptic, NAS , NBS , NCS , NDS , &c. are circles of latitude. The star H , is in so many degrees, minutes, and seconds of north latitude, as the arch HA amounts to; and the star I , is in south latitude, the quantity whereof is measured by the arch IB . From what has been said, it appears that we must carefully distinguish the different notions of latitude, when applied to stars in the heavens, and to places on the earth; that is, between latitude in astronomy, and latitude in geography; for in the heavens, or on the celestial globe, it is the distance from the ecliptic; but on the earth, or upon the terrestrial globe, it is the distance from the equator. Indeed, sometimes we consider the distance of the heavenly bodies from the celestial equator; but this is called declination, for finding which, see the article **DECLINATION**.

The latitude of a planet is either heliocentric, or geocentric. See the articles **HELIOCENTRIC** and **GEOCENTRIC**.

North ascending LATITUDE, of the moon, is when she proceeds from the ascending node towards her northern limit, or greatest elongation. See the articles **MOON**, **ELONGATION**, and **NODE**.

North descending latitude, is when the moon returns from her northern limit to the descending node. **South descending latitude**, is when she proceeds from the descending node to her southern limit. **South ascending latitude**, is when she returns from her southern limit to her ascending node.

The same thing holds good of the other planets. See the articles **ASCENDING** and **DESCENSION**.

LATITUDINARIAN, a person of moderation,

deration, with regard to religious opinions who believes there is a latitude in the road to heaven, which may admit people of different persuasions.

In this sense all protestants are latitudinarians, since they allow that many among the papists may be saved; though the bigotry of these last will not permit them to allow the same with respect to protestants.

LATRIA, λατρεία, among papists, signifies the worship due to God only; in contradistinction to *dulia*, which is that paid to saints. See the articles **ADORATION**, **WORSHIP**, **SAINT**, &c.

LATTEN, denotes iron-plates tinned over, of which tea-canisters are made.

Plates of iron being prepared of a proper thinness, are smoothed by rusting them in an acid liquor, as common water made eager with rye: with this liquor they fill certain troughs, and then put in the plates, which they turn once or twice a day, that they may be equally rusted over; after this they are taken out, and well scowered with sand, and, to prevent their rusting again, are immediately plunged into pure water, in which they are to be left till the instant they are to be tinned or blanched, the manner of doing which is this: they flux the tin in a large iron-crucible, which has the figure of an oblong pyramid with four faces, of which two opposite ones are less than the two others. The crucible is heated only from below, its upper part being luted with the furnace all round. The crucible is always deeper than the plates, which are to be tinned, are long; they always put them in downright, and the tin ought to swim over them; to this purpose artificers of different trades prepare plates of different shapes, tho' Mr. Reaumur thinks them all exceptionable. But the Germans use no sort of preparation of the iron, to make it receive the tin, more than the keeping it always steeped in water, till the time; only when the tin is melted in the crucible, they cover it with a layer of a sort of suet, which is usually two inches thick, and the plate must pass through this before it can come to the melted tin. The first use of this covering is to keep the tin from burning; for if any part should take fire, the suet would soon moisten it, and reduce it to its primitive state again. The blanchers say, this suet is a compounded matter; it is indeed of a black colour, but Mr. Reaumur supposed that to be only an artifice to make it a secret, and that

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it is only coloured with soot or the smoke of a chimney; but he found it true so far, that the common unprepared suet was not sufficient; for after several attempts, there was always something wanting to render the success of the operation certain. The whole secret of blanching, therefore, was found to lie in the preparation of this suet; and this, at length, he discovered to consist only in the first frying and burning it. This simple operation not only gives it the colour, but puts it into a condition to give the iron a disposition to be tinned, which it does surprisingly.

The melted tin must also have a certain degree of heat, for if it is not hot enough, it will not stick to the iron; and if it is too hot, it will cover it with too thin a coat, and the plates will have several colours, as red, blue and purple, and upon the whole will have a cast of yellow. To prevent this, by knowing when the fire has a proper degree of heat, they might try with small pieces of iron; but in general, use teaches them to know the degree, and they put in the iron when the tin is at a different standard of heat, according as they would give it a thicker or thinner coat. Sometimes also they give the plates a double layer, as they would have them very thickly covered. This they do by dipping them into the tin when very hot the first time, and when less hot the second. The tin which is to give the second coat, must be fresh covered with suet, and that with the common suet, not the prepared.

LATTEN-BRASS, plates of milled brass, reduced to different thickness, according to the uses it is intended for.

LATUS RECTUM, in conic sections, the same with parameter. See **PARAMETER**.

LATUS TRANSVERSUM, in the hyperbola, that part of the transverse diameter, intercepted between the vertices of the two opposite sections. See the article **HYPERBOLA**.

LATUS PRIMARIUM, a right line belonging to a conic section, drawn through the vertex of the section, and within it. See the article **CONIC SECTIONS**.

LAVAMUND, a city of Germany, in the circle of Austria, and dutchy of Carinthia, situated at the confluence of the rivers Drave and Lavamund: east long. 15°, and north lat. 47°.

LAVANDULA, **LAVENDER**, in botany, a genus of the didynamia-gymnospermia class of plants, the corolla whereof consists

sists of a single ringent petal; the tube is cylindric, and longer than the cup; the limb is patent; the superior lip is greater, bifid, and patent; the inferior one trifid, with all the lacinia roundish, and almost equal; there is no pericarpium; the cup is connivent at the mouth, and contains four roundish seeds.

Lavender is a cephalic, nervous, and uterine medicine; it is also good in vertigoes, lethargies, spasms, and even in pallsies, and apoplexies. It dispels flatulencies also, and is good in suppressions of urine and the menses. There is a water distilled from it well known for its fragrantcy and cephalic virtue.

LAVATERA, in botany, a genus of the monadelphia-polyandria class of plants; the corolla whereof consists of five plane, patent, vertically cordated petals, growing together at the base; the fruit consists of a number of capsules; the receptacle is columnar, and affixed to the capsules; the seed is single and kidney-shaped.

LAVATORY, or LAVOREDO, an appellation given to certain places in Chili and Peru, where gold is separated from earth by washing. See the articles GOLD and WASHING of ores.

LAUBACH, a city of Germany, in the circle of Austria, and the capital of the dutchy of Carinthia: east long. $14^{\circ} 40'$, and north lat. $46^{\circ} 28'$.

LAUDA, a town of Germany, in the circle of Franconia and bishopric of Wurtzburg: east long. $9^{\circ} 30'$, and north lat. $49^{\circ} 35'$.

LAUDANUM, a preparation of opium. See the article OPIUM.

LAUDER, a borough-town of Scotland, in the shire of Mers, situated twenty-two miles south-east of Edinburgh.

LAVENDER, the same with lavandula. See the article LAVANDULA.

LAVER, a sacred utensil in the temple of Jerusalem, consisting of a basin, whence they drew water by cocks.

LAUFFEN, a town of Germany, in the circle of Swabia and dutchy of Wirtemberg; situated on the river Neckar: east long. $9^{\circ} 5'$, north lat. 49° .

LAUFFENBURG, a town of Germany, in the circle of Swabia, situated on the Rhine: east long. 8° , north lat. $47^{\circ} 36'$.

LAUGHTER, a passion peculiar to mankind, occasioned by something that tickles the fancy. See the articles PASSIONS.

In laughter, the eye-brows are raised about the middle, and drawn down next the nose; the eyes are almost shut; the

mouth opens, and shews the teeth; the corners of the mouth being drawn back, and raised up; the cheeks seem puffed up, and almost hide the eyes; the face is usually red, and nostrils open, and the eyes wet.

LAUNCESTON, the county-town of Cornwall, thirty-six miles west of Exeter: west long. $4^{\circ} 40'$, north lat. $50^{\circ} 45'$.

It sends two members to parliament.

LAUNCH, in the sea-language, signifies to put out: as, *launch the ship*, that is, put her out of the dock: *launch aft*, or *foreward*, speaking of things that are stowed in the hold, is, put them more foreward: *launch, ho!* is a term used when a yard is hoisted high enough, and signifies hoist no more.

LAUNDER, among miners, a place where they wash the powdered ore. See the article WASHING of ores.

LAURA, in church-history, a name given to a collection of little cells, at some distance from each other, in which the hermits, in antient times, lived together in a wilderness.

These hermits did not live in community, but each monk provided for himself in his distinct cell. The most celebrated lauras mentioned in ecclesiastical history, were in Palestine; as the laura of St. Euthymius, at four or five leagues distance from Jerusalem; the laura of St. Saba, near the brook Cedron; the laura of the Towers, near the river Jordan, &c.

LAUREATION, in the universities of Scotland, signifies the act of taking the degree of master of arts, which the students are permitted to do after four years study.

LAURENCE, or *Canons regular of St. LAURENCE*, a religious congregation in France, said to have been founded by St. Benedict.

LAURENTALIA, in roman antiquity, a festival celebrated in honour of Acca Laurentia, Romulus's nurse.

LAURUS, in botany, a genus of the eneandria-monogynia class of plants, the corolla whereof consists of six ovato-acuminated, concave, and erect petals, the nectarium is composed of three coloured, acuminated tubercles, terminating in two hairs, and standing round the germen; the fruit is a drupe of an oval, acuminated figure, containing only one cell, and contained in the corolla; the seed is a single, ovato-acuminated nut, and its kernel is of the same figure.

This genus comprehends the laurus, or bay.

bay-tree, the cinnamon-tree, the camphire-tree, the benjamin-tree, and the saffra-tree. See the article CINNAMON, CAMPHOR, BENJAMIN, and SASSAFRAS.

The leaves and berries of the bay-tree, or common laurus, are only used in medicine, and are warm carminatives, and sometimes exhibited in this intention against flatulent colics, ; and likewise in hysterical disorders. Their principal use, in the present practice, is in glysters, and some external applications. The leaves enter our common fomentation, and the berries the plaster and cataplasm of cumin ; they also give name to an electuary, which is little otherwise used than in glysters.

LAUSANNE, a city of Switzerland, in the canton of Bern, situated on the north side of the lake of Geneva : east long. $6^{\circ} 31'$, and north lat. $46^{\circ} 33'$.

LAUTERBURG, a town of Germany, in the circle of the Upper Rhine, and landgravate of Alsace : east long. 8° , and north lat. $48^{\circ} 45'$.

LAUTERBURG is also a town of Poland, in the province of Royal Prussia : east long. 20° , and north lat. $53^{\circ} 30'$.

LAW, in general, is defined to be a certain rule for the good government of mankind in society. See GOVERNMENT. This rule or law is nothing but a decree, by which the superior obliges those subject to him, to accommodate their actions to the directions prescribed therein. But that a law may exert its force in the minds of those to whom it is promulgated, it is requisite that the law-giver and the law be likewise known. The legislator of the laws of nature, can be no other than the Creator of the universe. No man in civil society can be ignorant who it is that has power over him ; and of the laws he has notice given him, by a publication plainly and properly made, in which these two things ought to be ascertained, that the author of the law is he who hath the supreme authority in the community, and that this or that is the true meaning of the law. The first is known, if it be promulged with his own mouth, under his own hand, or if it be done by proper delegates regularly admitted to that office : they must be thus judiciously executed, and, besides that, contain nothing derogatory to the sovereign power. As to the true sense, after the greatest plainness used by the promulgers, an explication is to be sought

of the legislator, or those who are publicly appointed to give judgment according to law. See the article JUDGE.

Every perfect law has two parts ; the one directing what is to be done, or omitted ; the other declaring the punishment incurred, by neglecting to do what is commanded, or attempting what is prohibited. And herein all the force of law consists. See the article PUNISHMENT. Law may be divided, with respect to its authors, into divine and human : the former may be considered as twofold, to wit, natural or moral, and positive. Natural law is that which God has made known to mankind by the light of natural reason. Positive law is that which he has revealed by his prophets : such were the laws delivered to the Jews relating to the divine worship and polity peculiar to that people.

Civil or human laws, considered with respect to the legislator's two offices, of judging and compelling, may be divided into distributive and penal. Distributive law, is that which gives every subject what properly belongs to him, forbidding others to injure him either in his privileges or property : and penal law is that which determines, or appoints, what punishments shall be inflicted on those who violate the distributive laws ; it is mandatory, and speaks only to the public officers, or magistrates.

The laws of any kingdom, or state, first began with the state itself : and if we consider the world as one universal society, or Europe as one great commonwealth, the law by which separate nations is governed, with respect to treaties, alliances, the sending embassadors, &c. is called jus gentium, or the law of nations : but when it is considered as made up of particular states the law which regulates the public order of each, is called jus publicum ; and that law which determines the private rights of men, is called jus civile, or civil law. See CIVIL LAW. The laws of England are at present divided into the common law, which is the most antient law of the kingdom ; the statute-law, made by the king and both houses of parliament ; and particular customs in several parts of the kingdom : but our laws are more largely divided into the crown law ; the law and custom of parliament ; the common law ; the statute-law ; reasonable customs ; the law of arms ; ecclesiastical or canon-law ; the civil law ; the forest-law ; the law of

marque and reprisals; the law of merchants; martial law, &c. See the articles COMMON LAW, STATUTE, PARLIAMENT, FOREST, &c.

Our laws have great respect to life, liberty, freehold, and inheritance: their use is to secure the continuance of those blessings we enjoy; and they have therefore a particular relation to persons and their estates, to crimes and misdemeanors, &c. See ESTATE, CRIME, &c.

LAWs of nature, or *Motion*, in physics, are axioms, or general rules of motion and rest, observed by all natural bodies in their actions upon one another. Of these Sir Isaac Newton has established three, which may be seen under the article MOTION.

Salic LAW. See the article SALIC.

LAW of arms, is a law which gives precepts how to proclaim a war, to attack the enemy, and to punish offenders in the camp.

LAWENBURG, a city of Germany, in the dutchy of the same name, situated on the river Elbe, fifteen miles north-east of Lunenburg: east long. $10^{\circ} 37'$, and north lat. $53^{\circ} 45'$.

LAWING of Dogs, the same with expediting. See the article EXPEDITE.

LAWINGEN, a town of Germany, in the circle of Swabia, situated on the Danube: east long. $10^{\circ} 20'$, and north lat. $48^{\circ} 38'$.

LAWLESS COURT, a court said to be held annually on King's hill, at Rochford, in Essex, on the Wednesday morning after Michaelmas-day, at cock-crowing, where they whisper, and have no candle nor any pen and ink, but only a coal. Persons who owe suit, or service, and do not appear, forfeit double their rent every hour they are missing.

This servile attendance, Camden informs us, was imposed on the tenants for conspiring at the like unreasonable time to raise a commotion. The court belongs to the honour of Raleigh, and to the earl of Warwick, and is called lawless from its being held at an unlawful hour.

LAWN, a spacious plain in a park, or adjoining to a noble seat. As to the dimensions of a lawn, in a large park, it should be as extensive as the ground will permit; and, if possible, it should never be less than fifty acres: but in gardens of a moderate extent, a lawn of ten acres is sufficient; and in those of the largest size, fifteen acres. The best situation for a lawn, is in the front of the

house; and here, if the house front the east, it will be extremely convenient; but the most desirable aspect for a lawn, is that of the south-east. As to the figure of the lawn, some recommend an exact square, others an oblong square, some an oval, and others a circular figure: but neither of these are to be regarded. It ought to be so contrived, as to suit the ground; and as there should be trees planted for shade on the boundaries of the lawn, so the sides may be broke by irregular plantations of trees, which, if there are not some good prospects beyond the lawn, should bound it on every side, and be brought round pretty near to each end of the house. If in these plantations round the lawn, the trees are placed irregularly, some breaking much forwarder on the lawn than others, and not crowded too close together, they will make a better appearance than any regular plantations can possibly do; and if there are variety of trees properly disposed, they will have a good effect: but only those which make a fine appearance, and grow large, straight and handsome should be admitted here. The most proper trees for this purpose, are the elm, oak, chestnut and beech; and if there are some clumps of ever-green trees intermixed with the others, they will add to the beauty of the whole, especially in the winter-season; the best sorts for this purpose, are lord Weymouth's pine, and the silver and spruce firs.

LAWSONIA, in botany, a genus of the octandria-monogynia class of plants; the corolla whereof consists of four, plane, ovato-lanceolated, patent petals; the fruit is a globose capsule, terminating in a point, and containing four cells; the seeds are numerous, angular and acuminate.

LAWYER signifies a counsellor, or one that is learned or skilled in the law.

LAXATIVE MEDICINES, those which loosen the belly, and dispose a person to go frequently to stool: such are all cathartic, emollient, and lubricating medicines. See the articles CATHARTICS, EMOLLIENTS, &c.

LAXEMBURG, a town of Germany, in the circle of Austria, ten miles south of Vienna.

LAY, in french poetry, denotes a short poem, something like our ballads.

LAY-BROTHERS, among the remanists, those pious, but illiterate persons, who devote

devote themselves, in some convent, to the service of the religious. They wear a different habit from that of the religious, but never enter into the choir, nor are present at the chapters; nor do they make any other vow, except of constancy and obedience. In nunneries, there are also lay-sisters.

LAY *the land*, at sea, is said when they get out of sight of land.

LAY-LAND, or **LEY-LAND**, in husbandry, fallow ground, or such as lies untilled.

LAY-MAN, one who follows a secular employment, or has not entered into holy orders.

LAY-MAN, among painters, a small statue either of wax or wood, whose joints are so formed, that it may be put into any attitude or posture. Its principal use is for adjusting the drapery in cloathing of figures.

LAYERS, in gardening, are tender shoots, or twigs of trees, laid or buried in the ground; till having struck root, they are separated from the parent-tree, and become distinct plants.

Many trees may be thus propagated by layers; the ever-greens about Bartholomew-tide, and other trees about the month of October.

The operation is performed by flitting the branches a little way, and laying them about half a foot under the mould: the ground should first be made very light, and after they are laid, they should have a little water given them. If they do not comply well in laying them down, they must be pegged down with a hook or two; and if they have taken sufficient root by the next winter, they should be cut off from the main plants, and planted in the nursery. Some twist the branch, or bare the rind; and if it be out of the reach of the ground, they fasten a tub or basket near it, which they fill with good mould and lay the branch in it.

LAZAR-HOUSE, or **LAZARETTO**, a public building, in the nature of an hospital, to receive the poor and those afflicted with contagious distempers; in some places, lazarettos are appointed for the performance of quarantine; in which case, those are obliged to be confined in them who are suspected to have come from places infected with the plague. This is usually a large building, at some distance from a city, whose apartments stand detached from each other, where vessels are unladen, and the crew shut up

for about forty days, more or less, according to the time and place of their departure. The lazaretto of Milan is esteemed one of the finest hospitals in Italy.

LAZARITES, or *fathers of St. LAZARUS*, a religious congregation of regular clerks, instituted in France in the seventeenth century, by M. Vincent. They take their name from a house in the suburbs of Paris, where they have a seminary, called the seminary of good children. The vows they make are simple; and, upon occasion, may be dispensed with.

LAZULI, or *Lapis LAZULI*, in natural history, one of the ores of copper, the basis of which is a crystalline matter, coloured with that elegant blue which copper gives to all alkaline liquors.

It is a very compact and hard stone, and takes a high polish, and therefore is worked into a number of toys. It is found in detached lumps of the size of a man's fist, but often smaller, and sometimes of four or five pounds weight. It is never covered with any coat or crust, but resembles those stones which, having been washed off from whole strata, are rounded by accidents afterwards. It is naturally of a smooth and glossy surface, and its general colour is an elegant blue, but variegated in a beautiful manner with spots or clouds of white, and with veins of a fine shining gold-colour.

The lapis lazuli is found in many parts of the world, but that of Asia and Africa is much superior both in beauty and real value to the bohemian and german kind, which is too often sold in its place.

Chemical writers give several processes for magisteries, tinctures, and elixirs of lapis lazuli; but they are wholly out of use. Its virtues, in medicine, are those of a very violent purgative and emetic, which are owing to the copper it contains; but its violence in the operation has frightened people out of the use of it.

Its great use therefore, beside the polishing as a gem, is the making the fine blue used in painting, called ultramarine, which is obtained from it by calcination.

See the article **ULTRAMARINE**.

LEA, a river which rises near Luton in Bedfordshire, and falls into the Thames a little below Blackwall.

LEAD, *plumbum*, Pb , in natural history, a coarse, impure metal, called by chemists saturn. See the article **METAL**.

Lead is the heaviest of the metals next after

after gold; it is, indeed, considerably lighter than quicksilver, but the want of malleability denying that substance a place in the class of metals, lead is among them the second in weight. It is the softest of all the metals; easily flattened under the hammer, and ductile in a very great degree, though much less so than gold. Its colour is a pale bluish grey, it is very little subject to rust, and is the least sonorous of all the metals, except gold, with which it seems nearly on an equality, in regard to this property in its common state; but Mr. Reaumur has discovered that, if cast in the form of a segment of a sphere, it has some sound when struck upon; a property which gold does not acquire by being cast in the same form. See the article GOLD.

It requires the least degree of fire of all metals, except tin, to put it in fusion. It acquires this fluid state, long before it changes its colour; whereas the other metals, except tin, all become red-hot before they run: after melting, it very readily calcines into a grey powder, which, if the fire be increased and the matter often stirred, becomes yellow, and afterwards of a fine florid red: this is the minium, or common red lead of the shops. If the fire be made yet more vehement, it runs into an oleaginous matter, which, as it cools, becomes of a yellowish or reddish colour, and is composed of a number of thin laminæ; this is litharge. Though these several substances have nothing of the appearance of the metal they are produced from, yet, if a little iron-filings be added to them over the fire, or only some pieces of charcoal, or any other oily inflammable matter be thrown in, they become lead again. The scorix of lead, left to themselves in a strong fire, always run into glass, and in that form make their way through all sorts of vessels.

Lead very readily and easily amalgamates with mercury, and as readily mixes in fusion with all the other metals, except iron, though less easily with copper than the rest. The specific gravity of lead is, to that of water, as 11325 to 1000.

Lead, when in the bowels of the earth, enters into the body of crystals, as is very frequently the case with that crystal which is found about lead-mines, and influences its figure so far as to give it a cubic form. It often does this without at all altering its colour; but when it

tinges it likewise, the colouring it gives is yellow.

The topaz, among the gems, owes its yellow colour to this metal; and, in the factitious gems, we find that the tinge it gives to the composition is always a yellow, approaching to that of the topaz.

Lead-ore is readily distinguished to be such, being nearly of the colour of lead itself, or a little darker; very bright and glossy when fresh broken; and composed either of cubic or parallelopiped-masses, or of smaller granules, or else of striæ: in the first of these states it is commonly called potter's ore or diced lead-ore; in the second, steel-grained-ore; and in the third, antimoniated ore, from its resemblance to antimony.

Lead is more easily separated from its common ore than any other metal; there requires nothing for this purpose but a common wood-fire, kept up to a due strength by a blast of bellows. The lead-ore is thrown into this fire upon the wood, and the melted metal runs into a hollow at the bottom of the furnace made to receive it, from which they ladle it out and cast it into large masses. Such ores of lead as contain earth and stones are to be powdered and washed before they are committed to the fire, and such as contain pyrites or marcasite, which is no uncommon thing, must be roasted two or three times, in order to burn away the sulphur they are debased with; then powdered and washed, in order to their being committed to the fire, and finally mixed with the common black flux, if very refractory. See the article FLUX. If there be any occasion to separate lead from a mixture of copper in the regulus, nothing is more easy than to do it by a common fire; the heat of which being enough to melt lead, though not to fuse copper, will run it all off and leave the copper pure behind.

Lead is much used in building, especially for coverings, gutters, pipes and glazing; for which uses, it is either cast into sheets in a mould, or millet; which last is by much the least serviceable, not only on account of its thinness, but also because it is so exceedingly stretched in milling, that when it comes to lie in the hot sun, it shrinks and cracks, and consequently will not keep out the water. For the manufacture of all which, see the article PLUMBERY.

Lead has been celebrated by the chemical writers

writers for very great virtues in medicine, but, upon the whole, it seems to be a metal very cautiously to be given internally, and rather calculated for outward application. Its ore is poisonous: the steam which arises from the furnace where it is worked, infects the grass of all the neighbouring places, and kills the animals that feed on it; and among the preparations of it, the salt called *saccharum saturni*, which is by much its best form for medicine, and which is able to do great service, in hæmorrhages and some other cases; it is apt, however, to bring on colics of a very violent kind, and so many other disorders, that the remedy often proves worse than the disease. The preparations of lead, are, 1. Minium, or red-lead. 2. Litharge. 3. Burnt-lead, *plumbum ustum*. 4. Ceruse. 5. Salt, or sugar of lead, *saccharum saturni*. See MINIMUM, LITHARGE, CERUSE, and SACCHARUM SATURNI.

Burnt LEAD is thus prepared: cut a quantity of the thinnest milled lead that can be got into small plates; fill an earthen vessel, that will bear the fire, with these plates and powder of common brimstone, laid *stratum super stratum*; set it over the fire, and when the sulphur is burnt away, the lead will be found reduced to a blackish powder. Five ounces of sulphur will serve for half a pound of lead. The matter is to be stirred while it remains on the fire; and when it is cold, the powder is to be washed three or four times with common water, and then dried for use; being of the same virtue with litharge, or red-lead, in ointments and plasters. Mixed into an unguent with lard alone, it makes a good ointment for the piles. However, it ought to be remarked, that it is intended only for external use.

Besides the preparations already mentioned, we find mention of balsam and magistery of lead. Balm, or balsam of lead, is only an oil drawn, by distillation, from salt of lead dissolved in spirit of turpentine. Magistery of lead is the calx of lead purified and subtilised in aqua fortis; which, being several times washed, becomes extremely white, and is mixed with pomatums for the face and complexion.

Black LEAD, or *MOCK LEAD*, *plumbago*.

See the article PLUMBAGO.

Glass of LEAD. See the article GLASS.

LEAF, *folium*, in the natural history of plants, a very essential and ornamental

part of plants, whose chief office is to subtilise and give more spirit to the abundance of nourishing sap, and to convey it to the little buds.

Botanists consider the leaves of plants, with regard to their structure, their surface, figure, consistence, edges, situation and size. With regard to their structure, they are either single, as those of the apple-tree and pear-tree; or double, as those of angelica and parsley. With respect to their surface, they are either flat, as the nummularia and origany; or in bunches, as several kinds of kali and houseleeks. With regard to their consistence, they are either thin and fine, as those of St. John's wort; or thick and gross, as those of portulaca; or fleshy, as those of several kinds of houseleek; or woolly, as those of gnaphalium. With regard to their edges, leaves are either cut slightly, as some species of geums; or deep, as in some of the jaceas. With regard to their situation, they are either ranged alternately, as the alaternus; or opposite to each other, as the phillyrea and the mints. With regard to their size, they are either very large, as those of the colocasia and sphondylium; or moderate, as those of bistort and the fig-tree; or small, as those of the apple-tree and pear-tree; or very small, as that of St. John's wort.

Most sorts of small plants, and also several sorts of trees, which put forth a root at the small end of the seed, put out two small leaves that are not at all like those that grow on the plant or tree, as soon as the root has taken hold of the ground; and afterwards between these false leaves, there comes forth a shoot which produces leaves like those of the plant or tree from which it came: of this manner of growth, there is an infinite number of plants and trees.

Doctor Grew justly observes, that the fibres of leaves are composed of two general kinds of vessels, *viz.* those for sap and those for air; and, that these are ramified out of greater into less, like the veins and arteries in animals: and all naturalists ascribe to them very important uses; the most singular of which is, that they, in some measure, perform the same office for the support of the vegetable life, as the lungs of animals do for the support of animal life; and, that it is highly probable, that plants draw some part of their nourishment from the air through their leaves. These, in the spring,

spring, receive the crude humours, divide them very minutely, and carry back great plenty of elaborated juice to the plant. By these a transpiration is carried on of what is unprofitable, answering to the discharge in animal bodies made by sweat; for sometimes the excretory vessels of the leaves are so over-charged by the great plenty of the distending humour, or juice, that they burst in the middle, and let go the more subtile parts; and it frequently happens, that, in a hot season, a great plenty of juices are this way discharged and imbibed. Thus manna is found to exude as well from the leaves as from the bark, especially if a cold night follows a hot day; and the same thing frequently happens in several other plants and trees, as we learn from the bees flying to the lime-tree, that they may gather that gumous substance from its leaves; but if the heat be less, all the superfluous juices, except those which are, perhaps, transmitted by insensible perspiration thro' the arterial vessels, exhale naturally, and return into the trunk. It is also found, that the bibulous vessels, dried by the diurnal heat, imbibe, especially in the night-time, those watry vapours which arise in form of a very thin dew, and so make amends for the loss made by the arteries, by the new moistures received. Lastly, the leaf serves, in a singular manner, to nourish the eye, or gem, until growing by degrees to a greater bulk, it presses the vessels of the foot-stalk together, from whence the humour is, by little and little, stopped in the leaf till it cannot any more return thro' the footstalk; which, by the ceasing of the afflux and reflux of the nutritious juice, grows putrid, whence a consumption being caused, the leaf dies, and falls off; which is the chief cause of the falling of the leaves in autumn.

Some have made the observation, that all ever-greens have their wood-cloze and compact between their annular circles; and, that their holding their leaves all the winter, proceeds from the nature of their sap, which is of a clammy and turpentine nature; and, that this sap is easily condensed by the cold, and requires a great deal of heat to make it thin and put it in motion: thus a little cold, condenses or stiffens pitch or turpentine, but it must be a frost that stays the motion of water. From whence it happens, that those trees which hold their leaves will grow much better under the droppings

of other great trees, than such as shed their leaves, because their turpentine-sap shoots off the drops, and prevents their entering the vessels in too great quantities. The various forms and kinds of leaves, as pinnated, digitated, crenated, hastated, &c. are described under the articles PINNATED, CRENATED, HASTATED, &c.

LEAF, in architecture, the representation of the leaf of the acanthus on the capital of the corinthian and composite orders. See the articles CORINTHIAN and COMPOSITE.

LEAF, in clocks and watches, an appellation given to the notches of their pinions. See the articles CLOCK and WATCH.

LEAGUE, a measure of length, containing more or less geometrical paces, according to the different usages and customs of countries. A league at sea, where it is chiefly used by us, being a land measure mostly peculiar to the French and Germans, contains three thousand geometrical paces, or three english miles. The french league sometimes contains the same measure, and in some parts of France it consists of three thousand five hundred paces: the mean or common league consists of two thousand four hundred paces, and the little league of two thousand. The spanish leagues are larger than the french, seventeen spanish leagues making a degree, or twenty french leagues, or sixty-nine and an half english statute miles. The dutch and german leagues contain each four geographical miles. The persian leagues are pretty near of the same extent with the spanish; that is, they are equal to four italian miles; which is pretty near to what Herodotus calls the length of the persian parasang, which contained thirty stadia, eight whereof, according to Strabo, make a mile.

LEAGUE also denotes an alliance or confederacy between princes and states for their mutual aid, either in attacking some common enemy, or in defending themselves.

LEAGUES of the Grisons, are a part of Switzerland, consisting of three subdivisions, viz. the upper league, the league of the house of Gad, and the league of the ten jurisdictions. See the article SWITZERLAND.

LEAK, among seamen, is a hole in the ship through which the water comes in. To spring a leak, is said of a ship that begins to leak. To stop a leak, is to fill it

it with a plug wrapt in oakum and well tarred, or putting in a tar-pawling clout, to keep the water out; or nailing a piece of sheet-lead upon the place.

LEAKAGE, the state of a vessel that leaks, or lets water, or other liquid, ouze in or out. See the preceding article. Leakage, in commerce, is an allowance of 12 *per cent.* in the customs, allowed to importers of wines for the waste and damage it is supposed to have received in the passage: an allowance of two barrels in twenty-two is also made to the brewers of ale and beer, by the excise-office.

LEAOTUNG, the most northerly part of China, in Asia. See **CHINA**.

LEAP, *salto*, in music, is when the song does not proceed by conjoint degrees, as when between each note there is an interval of a third, fourth, fifth, &c. See the articles **DEGREE** and **CONJOINT**.

It is to be observed, that there are two kinds of leaps; the regular leaps and the irregular ones. Regular leaps, are those of a third major or minor, whether natural or accidental, fourth, fifth, sixth, minor and octave, and these either ascending or descending. Irregular leaps, are the tritone, sixth major, seventh major, the ninth, tenth, and, in general, all beyond the compass of an octave, unless it be for instruments.

Besides these, there are some that may be used with discretion, as the fourth diminished, the fifth false or defective, and flat seventh; but mostly descending, very seldom rising. In effect, all the difference between the regular and irregular leap, is, that these which are easily performed by the voice, without any great struggle or effort, are regular, as the contrary are irregular. These last should be very seldom used in a song, unless there is a silence between them long enough to weaken the idea of the first sound before the second be heard.

LEAP-YEAR, the same with bissextile. See the article **BISSEXTILE**.

Every centesimal, or hundredth year, is a leap-year, according to the Julian account, but according to the gregorian, it is always a common year, except when the number of centuries can be divided by 4 without a remainder, for then it is a leap-year; but the intermediate centesimal years are common ones: hence, to know if it be leap-year, the rule is, If the year consists of complete centuries, and can be divided by 4, it is leap-year;

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as it is also, when the intermediate years can be divided by 4: thus the year 1756 was a leap-year; for 56 may be divided by 4, without a remainder. If the intermediate years cannot be divided by 4, the remainder shews the number of years over leap-year.

LEARMOUTH, a market-town of Northumberland, situated forty-eight miles north-west of Newcastle, and twelve south-west of Berwick.

LEASE, in law, a demise or letting of lands, tenements, or hereditaments unto another for life, term of years, or at will, for a rent reserved.

All estates, or terms for years, in lands, &c. which are not reduced into writing and signed by the parties, shall have no greater effect than as estates at will, unless it be leases of terms not exceeding three years from the making. In case the substance of a lease that exceeds three years be put in writing, and signed by the parties, though such a lease be not sealed, it will have the effect of a lease for years. If articles of agreement are made with covenants to make a lease for a certain term under a particular rent reserved, this seems to imply a lease, and has been so adjudged. The words, *to have and possess lands*, in consideration of a yearly rent, will make a lease of the land; also a licence to occupy and take the profits, &c. amounts to a lease. A husband may make such leases of lands held in tail in the right of his wife, provided that she be made a party thereto. Where a person has an estate for life, he is at liberty to grant a lease during such estate. One interested in lands, &c. for a term of years, may make a lease of all the years except one day, or other short part of the term: for it must be granted for a less time than the lessor has in the lands, otherwise it will be an assignment. By the common law, a lease for life cannot be made so as to commence in futuro, for this reason, that livery cannot be made to a future estate, though a lease for term of years may begin either on a day past or to come, as at Michaelmas last, or Christmas next, &c.

LEASE and **RELEASE**, as used in our law, signifies a certain instrument in writing, for the conveyance of a right or interest in lands and tenements in fee to another. In the making of this conveyance, a lease or bargain and sale for a year, bearing date the next day before the date of the release, is first executed, to the intent that

by virtue thereof, and of the statute made for transferring of uses into possession, the lessee may be in the actual possession of the lands, &c. intended to be granted by the release, and to be thereby enabled to take a grant of the reversion and inheritance of the said lands, &c. to him, his heirs and assigns for ever; after which the release must be executed, reciting the lease or bargain and sale, and declaring the use.

A release made by a person, that at the time of the making thereof had no right to the lands, is void in law; as it is likewise when made to a man who at the time of its making hath nothing in the lands; for he ought to have either a freehold therein, or a possession or privity. A lease and release being only in the nature of one deed, make but one conveyance.

The release consists of the following principal parts, *viz.* the names of the parties, their places of abode, and their additions; the consideration and granting part, with the particulars of what is granted; the habendum, or explanatory clause, shewing what interest is granted, to whom, and for what use: then a covenant that the releasor is lawful owner, is seized in fee, and hath a good right to grant, &c.

LEASH, among sportsmen, denotes three creatures of any kind; but chiefly greyhounds, foxes, bucks and hares.

The term leash also signifies a line to hold in a hunting dog; and a small long thong of leather, by which a falconer holds his hawk.

LEATHER, the skin of several sorts of beasts dressed and prepared for the use of the various manufacturers, whose business it is to make them up. The butcher and others, who flay off their hides or skin, dispose of them raw or salted to the tanner and tawyer; and they to the shamoy, morocco, and other kind of leather-dressers, who prepare them according to their respective arts, in order to dispose of them among the curriers, glovers, harness-makers, coach-makers, saddlers, breeches-makers, gilt leather-makers, chair-makers, shoe-makers, book-binders, and all in any way concerned in the article of leather.

The three principal assortments of leather are tanned or tawed, and oil and alum-leather; and it may be affirmed, with great truth, that the skins of our own production, and those imported from

our colonies, when dressed in this kingdom, make the best leather in the world, and that therefore this is an article of great importance to the trade of the nation.

Though there is no little difference between the dressing of shamoy-leather, alum-leather, hungary leather, morocco leather, parchment, and tanning; yet the skins which pass through the hands of these several workmen, ought to have been for the most part, at least, washed clean from blood and impurities in a running water; set to drain, worked with the hands, or pounded with wooden pestles in a vat; put into the pit (which is a hole lined either with wood, or with stone and mortar) filled with water in which quick-lime is dissolved, in order to loosen the hair, that it may be easily rubbed off without injuring the skin; drawn out, and set to drain on the edge of the pit; stretched on the leg or horse, in order to have the hair scraped off with a blunt iron-knife, or wooden cylinder; the membranes on the fleshy side, and the scabs or roughness on the grain-side, pared off with a sharp knife; and the skins rubbed with a whetstone, to take off any particles of the lime, or any thing else that may occasion hardness; thickened by different sorts of powder, whereby they become greater in bulk, and so much lighter, as gradually to rise to the surface of the water; stretched out green or half dried, and piled one over another; or put up separate after they are dried, and hung out to air upon poles, lines, or any other way: which must be repeatedly done in the dressing of small skins. This alternate transition from the liquid of the air into that of water, and from water into the air, with the assistance of lime, salts, and oils, opens the inmost fibres of the skin so effectually, as greatly to facilitate the introduction of substances proper for making them pliant without rendering them thinner. The alum leather-dresser dresses all sorts of white leather from the ox-hide to the lamb-skin; for dressing the sadler's leather, he uses bran, sea-salt, and alum; and for that which the glover uses, after the common preparatives, he first employs bran, and then with salt, alum, fine flower, and yolks of eggs mixed in hot water, he makes a sort of pap, with which the skins are smeared in a trough. The shamoy leather-dresser soaks in oil, not only the skins of the true shamoy, which

which is a wild goat, but likewise those of all other goats. The tanner uses the bark of young oaks ground in a tanning mill, in which he soaks the skins more or less, according to the different services expected from them, their chief use being to remain firm and keep out water. In certain cases, instead of tan, he uses redon, which is chiefly used for tanning ram, sheep-skins, and dressing russia leather. But for the different methods in which the tanner, currier, russia and morocco leather-dressers proceed in finishing their skins, see the articles CURRYING, TANNING, &c. and for the duties on leather and skins, see the articles EXCISE, FURR, &c.

Colouring of LEATHER. To colour white leather, the best way. Hang the skins in chalk or lime-water, till they are grown supple, that the hair or wool may be stripped off; stretch them on tenters, or by means of lines, and smooth them over: then brush them over with alum-water very warm, and colour them with the colour you would have them, and dry them in the sun, or in some warm house, and they will be useful on sundry occasions, without any farther trouble.

To colour black-leather the German way. Take of the bark of elder two pounds, of the filings or rust of iron the same quantity; put them into two gallons of rain-water, and stop them up close in a cask or vessel, and let them stand for the space of two months: then add to that the liquid part of a pound of nut-galls, beaten to powder, and a quarter of a pound of copperas, heating them over the fire, and suffering them to stand 24 hours after; and then use the liquor with a brush till the skin has taken a fine black.

To colour leather a fair red. First rub the leather well in alum-water, or alum it; boil stale urine, scum it, till half of it is wasted: then put in an ounce of the finest lake, the like quantity of brazil in powder, one ounce of alum, and half an ounce of sal-armoniac; mix them well, and keep them stirring over a gentle fire about two hours, and so use the liquid part, to colour or tinge the skins.

To colour leather of a curious french yellow. Take one part of chalk, and another of wood-ashes, and make of them a good lye; then strain out the fine liquor, and set it in a vessel over the fire, and put into it turmeric in powder, and a little saffron; and let it simmer, till it

becomes pretty thick; then set it a cooling, to be used as occasion requires.

To make white leather blue. Take a quart of elder berries, strain out the juice, and boil it with an ounce of powder of alum, and half an ounce of indigo, or smalt-blue, and brush over the leather with a fine brush dipped in it three times, suffering it to dry between whiles, and the business will be effected. To colour spanish leather, &c. Take that which the Dutch call pomplemelch, warm it, and rub the leather with it; then take of venice tot appelen, and having pounded it small, put a quantity of water to it, and let it soften over a gentle fire; then press out the water, and rub or wash out the skin in it; repeating the same several times; and after that, take the finest shoemakers black, and rub the skin over with it, having in the melting added a little vitriol or copperas, and letting it dry, take goose or hog's grease, and with a woollen cloth rub the skin over for a good while, where there is a good fire to supple it, and afterwards rub it over with your hands, till it disappear; or instead of grease, you may use linseed or train-oil, and so in case of any other colour, according to the colours you design.

Dying of LEATHER. To dye leather of a reddish colour. First wash the skins in water, and wring them out well, and afterwards wet them with a solution of tartar and bay-salt in fair water, and wring them out again; then to the former dissolution add ashes of crab-shells, and rub the skins very well with this: afterwards, wash them in common water, and wring them out; then wash them with tincture of madder in the solution of tartar and alum and the crab-shell ashes: and if they prove not red enough after all, wash them with the tincture of brazil.

To dye leather of a pure yellow. Take of fine aloes two ounces, of linseed-oil four pounds; dissolve or melt them; then strain the liquor, and besmear the skins with it, and being dry, varnish them over.

To dye skins of an orange. Boil fustic-berries in alum-water: but for a deep orange, use turmeric-root.

To dye leather blue. Boil elder-berries, or dwarf-elder in water; then smear or wash the skins with it; wring them out; then boil the berries as before in a solution of alum-water, and wet the skins in the same water once or twice;

dry them, and they will be very blue.
To dye leather of a pure sky-colour. For each skin take indigo one ounce, put it into boiling water, let it stand one night; then warm it a little, and with a brush-pencil besmear the skin twice over.

To dye leather purple. Dissolve roch-alum in warm water, wet the skins with it, dry them; then boil rasped brazil well in water; let it stand to cool: do this three times, and afterwards rub the dye over the skins with your hand, and when they are dry, polish them.

To dye leather green. Take sap green and alum-water, of each a sufficient quantity; mix and boil them a little; if you would have the colour darker, add a little indigo.

Gilding of LEATHER. Take glair of the whites of eggs or gum-water, and, with a brush, rub over the leather with either of them; then lay on the gold or silver, and letting them dry, burnish them. See the articles GILDING and BURNISHING.
To dress or cover leather with silver or gold. Take brown red, grind or move it on a stone with a muller, adding water and chalk, and when the latter is dissolved, rub or lightly dawb the leather over with it, till it looks a little whitish, and then lay on the leaf, silver or gold, before the leather is quite dry, laying the leaves a little over each other, that there may not be the least part uncovered; and when they have well closed with the leather, and are sufficiently dried on, and hardened, rub them over with an ivory polisher, or the fore-tooth of a horse.

For the duties on LEATHER, see the articles HIDES, SKINS, &c.

LEAVEN, a piece of sour dough, used to ferment and render light a much larger quantity of dough or paste.

LEAVER, or LEVER, in medicine. See the article LEVER.

LEBUS, a town of Germany, in the marquisate of Brandenburg, situated on the river Oder: east long. 15° , north lat. $52^{\circ} 30'$.

LECCIE, a city of Italy, in the kingdom of Naples, and territory of Otranto: east long. 19° , north lat. $40^{\circ} 32'$.

LECCO, a town of Italy, in the duchy of Milan: east long. $9^{\circ} 40'$, north lat. $45^{\circ} 45'$.

LECH, a river of Germany, which rises in Tyrol, and running north, divides Swabia from Bavaria, and having passed by

Landsprug and Augsburg, falls into the Danube below Donawert.

LECH is also a river of Holland, which runs from east to west through the provinces of Gelderland and Utrecht, and uniting with the waters of the Maes, falls into the German sea, near the city of Briel.

LECHEA, in botany, a genus of the triandria-monogynia class of plants, the calyx of which is a three-leafed perianthium: the leaves are concave, patent and permanent; the corolla consists of three oblong leaves, narrower than the cup; the fruit is an oval, three-cornered capsule, composed of three valves, and containing three cells, in which is a single oval seed.

LECHIA, in ichthyology, the scomber, with two fins on the back, and the last ray on the hinder fin very long. See the article SCOMBER.

LECHLADE, a market-town of Gloucestershire, ten miles east of Cirencester.

LECHNICH, a town of Germany, in the circle of the Lower Rhine, and electorate of Cologne: east long. $6^{\circ} 35'$, north lat. $50^{\circ} 40'$.

LECLUSE, a town of the french Netherlands, in the province of Flanders, five miles south of Doway: east long. 3° , north lat. $50^{\circ} 20'$.

LECTICA, in roman antiquity, a vehicle in which people were carried in a reclining posture.

LECTISTERNIUM, a religious feast or banquet of the antient Romans. In times of public danger or calamity, or of thanksgiving for some happy event, the republic ordered solemn feasts to be made for the gods; and this solemnity was called lectisternium, because on this occasion they spread tables, and placed beds around them, on which their heavenly guests were to lie and eat. These beds were placed near the altars; they were strewn with leaves and odoriferous herbs; cushions were laid for the gods to rest their heads upon, and their statues laid upon these beds as if they were to partake of the feast: while the goddesses were placed in chairs, after the manner of the roman ladies. During the time this religious ceremony lasted, the Romans crowded to the temples; and the senators, preceded by the pontifex maximus, came to the place where the ceremony was performed, with crowns on their heads, singing hymns in praise of the gods, whose statues were carried in triumph

nymph in chariots and on biers, accompanied with music.

LECTOUR, a city of France, in the province of Gascony: east long. $25'$, north lat. 44° .

LECTURERS, in England, are an order of preachers in parish-churches, distinct from the rector or vicar. They are chosen by the vestry, or chief inhabitants of the parish, and are usually the afternoon preachers.

The law requires, that they have the approbation and admission of the ordinary, and that at the time of their admission, they subscribe to the thirty-nine articles of religion, &c. required by the statute, 14 Car. II. and they are to be licensed by the bishop, like other ministers.

Where there are lectures founded by the donations of pious persons, the lecturers are appointed by the founders, without any interposition or consent of rectors of churches, &c. though with the leave and approbation of the bishop; such as that of lady Moyer, at St. Paul's.

LEDBURY, a market-town of Herefordshire, thirteen miles east of Hereford.

LEDESMA, a town of Spain, in the province of Leon, situated on the river Tormes, eighteen miles west of Salamanca: west long. $6^{\circ} 35'$, north lat. $41^{\circ} 15'$.

LEDGES, in a ship, are small pieces of timber lying a-thwart from the wastetrees to the roof trees: they serve to bear up the gratings or nettings over the half-deck. See the article SHIP.

LEDGER, the principal book wherein merchants enter their accounts. See the article BOOK.

LEDUM, the *MARSH-CISTUS*, in botany, a genus of the decandria-monogynia class of plants, the corolla whereof consists of five hollow, patent, oval petals; the fruit is a roundish capsule, containing five cells and opening in five places at the base; the seeds are numerous, oblong, narrow-pointed at each end, and very slender.

LEE, in the sea-language, a word of various significations; though it is generally understood, to mean the part opposite to the wind. Thus *lee-shore*, is that shore against which the wind blows. *Lee-latch*, or have a care of the lee-latch, is, take care that the ship don't go to the leeward, or too near the shore. *A lee the helm*, put it to the leeward side of the ship. *To lie by the lee*, or to come up to the lee, is, to bring the ship so, that all her sails may lie flat against her masts and shrouds, and that the wind

may come right upon her broad-side.

LEE-FANG, is a rope reeved into the cringles of the courses, to hale in the bottom of the sail, that the bonnets may be laced on, or the sail taken in.

LEE-WAY, is the angle that the rhumb-line, upon which the ship endeavours to sail, makes with the rhumb upon which she really sails.

This is occasioned by the force of the wind, or surge of the sea, when she lies to the windward, or is close hawled; which causes her to fall off and glide side-ways from the point of the compass she capes at. Thus, let *NE SW* (plate CLV. fig. 2. n^o 1.) represent the compass, and suppose a ship at *C* capes at, or endeavours to sail upon the rhumb *Ca*, but by the force of the wind and surge of the sea she is obliged to fall off, and make her way good upon the rhumb *Cb*; then the angle *aCb* is the lee-way; and if that angle be equal to one point, the ship is said to make one point lee-way; or if equal to two points, the ship is said to make two points lee-way, &c.

The quantity of this angle is very uncertain; because some ships, with the same quantity of sail, and with the same gale, will make more lee-way than others; it depending much upon the mould and trim of the ship, and the quantity of water that she draws. However, the common allowances made for lee-way, are these: 1. If the ship be close hauled, has all her sails set, the water smooth, and a moderate gale of wind, she is supposed to make little or no lee-way. 2. If it blow so fresh, as to cause the small sails to be handed, it is usual to allow one point. 3. If it blow so hard, that the tops must be close reefed, the ship then makes about two points lee-way. 4. If one topsail must be handed, it is common to allow two and three quarters or three points lee-way. 5. When both topsails must be handed, they allow about four points lee-way. 6. When it blows so hard, as to occasion the fore-course to be handed, the allowance is between five and a half and six points. 7. When both main and fore courses must be handed, then six or six and a half points must be allowed for her lee-way. 8. When the mizzen is handed, and the ship is trying a hull, she then makes her way good about one point before the beam, that is, about seven points lee-way.

Though these rules are such as are generally

rally used, yet as the lee-way depends much upon the mould and trim of the ship, we shall here give the method of ascertaining it by observation: thus let the ship's wake be set by a compass in the poop, and the opposite rhumb is the true course made good by the ship; then the difference between this and the course given by the compass in the binnacle, is the lee-way required. If the ship be within sight of land, the lee-way may be exactly found by observing a point on the land which continues to bear the same way; for the distance between the point of the compass it lies on, and the point the ship capes at, will be the lee-way. Thus, suppose a ship at C (*ibid.* n° 2.) is lying up N^bW, towards A; but instead of keeping that course she is carried on the NNE line CB, and consequently the point B continues to bear always the same way from the ship: here it is evident, that the angle ACB, or the distance between the N^bW line that the ship capes at, and the NNE line that the ship really sails upon, will be the lee-way. See the articles COMPASS, COURSE, JOURNAL, &c.

LEECH, *hirudo*, in zoology. See the article HIRUDO.

Leeches, used for bleeding, should be chosen from clear and running waters, for those from stagnant ones, and dirty ponds, seem to have something malignant in the bite. The surgeons usually choose such as have slender heads, green lines on their backs, and bellies of a reddish yellow. But from whatever waters these creatures have been taken, the best method is to keep them many days in a glass of water, changing it often, that they may cleanse themselves. Before the leech is applied to the skin, it should be taken out of the water, and kept an hour in an empty cup, to drain itself, that it may thus be rendered thirsty and empty. The skin too must be well rubbed, till it become hot and red, and then either hold the leech by the tail to the part, or let it crawl of itself out of the cup upon it. By this means they readily lay hold; but if they refuse, the blood of a chicken or pigeon should be rubbed on the part; and if that does not allure them, they must be laid aside as useless, and others taken in their stead. They may be properly applied to the temples, or behind the ears, in disorders of the head, and to the veins of the rectum in the blind piles. And applied to

this part also, they often prove of great service in hæmorrhages at the nose, or spittings of blood, especially when these have been occasioned by a stoppage of the usual discharges that way; though where that is not the case, they do great service merely by revulsion.

If much blood is required to be drawn, the tails of the leeches may be cut off as they are sucking, by which means, the blood they have already sucked will be discharged, as well as what they continue to take in; for they will not let go their hold, but continue sucking as before.

If they do not let go after a sufficient quantity of blood is drawn, they are not to be pulled off, for that often occasions tumours and inflammations; but if a little salt be sprinkled on the place, they quit their hold. The orifices should be washed with warm wine or water, and they usually heal of themselves.

LEEDS, a large market-town in the west riding of Yorkshire, situated on the river Aire, twenty miles south-west of York: it has a very great woollen trade.

LEEK, a garden-plant, called by botanists porrum. See the article PORRUM.

Leeks are commonly sown along with onions; the onions growing up first are pulled up, so that the leeks have room to grow to their full size.

Great-house LEEK, and tree house LEEK, in botany, the English names of two different species of the sempervivum. See the article SEMPERVIVUM.

LEEK, in geography, a market-town sixteen miles north of Stafford.

LEER, in glass making, a furnace where the vessels are allowed to cool by degrees. See the article GLASS.

LEERDAM, a town in the province of Holland, seventeen miles north-east of Dort: east long. 5°, north lat. 51° 50'.

LEERWICK, a town of Scotland, in Main-land, one of the islands of Shetland, in the county of Orkney: west long. 30', north lat. 61° 20'.

LEES, according to Boerhaave, are the more gross and ponderous parts of liquors, which, being separated by fermentation, fall to the bottom.

If this feculent matter be dried, and afterwards burnt in a naked fire, it affords saline ashes, from whence a fixed and somewhat or even truly alkaline salt may be obtained; whence it is evident, that the most perfect fermentation cannot volatilize that matter of vegetables, which

is fixed by burning in the fire. See the article FERMENTATION.

A spirit of a very agreeable flavour is obtained, by the common process of distillation, from wine lees; and as this flavour depends greatly on the essential oil of the lees, care should be taken to bring it over with the spirit. In order to this, the solid lees must be steeped in six or eight times their own weight of water, and well stirred at times, before it is put into the still. See DISTILLATION.

LEET, *leta*, a little court held within a manor, and called the king's court, on account, that its authority to punish offences originally belonged to the crown, from whence it is derived to inferior persons. See the article COURT-LEET.

LEETCH of a sail, is the outward edge or skirt of the sail from the earing to the clew; or the middle of the sail, between the earing and the clew.

LEETCH-LINES, small ropes made fast to the leetch of the topsails, to which they belong, and reeved into a block at the yard close by the topsail-ties. They serve to hale in the leetch of the sail when the topsails are to be taken in.

LEEWARD, at sea, the side opposite to that on which the wind blows. See the article LEE.

LEEWARD-SHIP, one that makes a great deal of lee way. See LEE-WAY.

LEEWARD-ISLANDS, in America, a name given to the Caribbees.

LEG, *crus*, in anatomy, the whole lower extremity from the acetabula of the ossa innominata, commonly divided into three parts, *viz.* the thigh, the leg properly so called, and the foot. See the articles THIGH and FOOT.

The leg consists of three bones, the tibia, fibula, and rotula; or, as it is otherwise called, the patella. See the articles TIBIA, FIBULA, &c.

For the arteries, veins, nerves, and muscles of the leg, see the articles ARTERY, NERVE, VEIN, and MUSCLE.

LEGACY, signifies any thing that is particularly given or bequeathed by a last will and testament. See the articles WILL and TESTAMENT.

The person to whom such a legacy is left, is termed the legatee. There is a residuary legatee, or one to whom, after several devises or bequests made by will, the residue of the testator's estate and effects are given. See DEVISE.

On a devise of a sum of money to be paid a person at the age of twenty-one

years, or on the day of marriage, if the legatee die before either of these happen, his administrator shall have the legacy. See the article ADMINISTRATOR.

If a legacy is bequeathed, and no certain time of payment mentioned, and the legatee is an infant, he shall be intitled to interest for his legacy from the expiration of a year after the death of the testator, which time is allowed an executor to see whether there be any debts; but it is otherwise when the legatee is of full age, in such a case he shall not have any interest, but from the time of the demand of the legacy; and if the legacy given is payable at a certain day, it must be paid with interest from that day.

LEGATE, a cardinal or bishop, whom the pope sends as his ambassador to sovereign princes. See EMBASSADOR.

There are three kinds of legates, *viz.* legates a latere, legates de latere, and legates by office, or legati nati; of these the most considerable are the legates a latere, the next are the legates de latere. See the article LATERE.

Legates by office are those who have not any particular legation given them, but who by virtue of their dignity and rank in the church, become legates: such are the archbishop of Rheims and Arles: but the authority of these legates is much inferior to that of the legates a latere.

The power of a legate is sometimes given without the title. Some of the nuncios are invested with it. It was one of the ecclesiastical privileges of England from the norman conquest, that no foreign legate should be obtruded upon the English, unless the king should desire it upon some extraordinary emergency, as when a case was too difficult for the english prelates to determine.

LEGATUS, in roman antiquity, a military officer who commanded as deputy of the chief general. The design of the legati at their first institution, was not so much to command as to advise. They were chosen by the consuls, the authority of the senate concurring with their nomination. There were two kinds of legati, *viz.* a legatus in the army, under the imperator or general, who commanded in chief under him, and managed all affairs by his permission; and a legatus in the provinces, under the proconsul or governor, in whose absence the legatus had the honour to use the fasces, and was intrusted with the same charge as the officer he represented. As to the number

ber of the *legati* we have no certainty, but may suppose that this depended upon the pleasure of the general, &c. Under the emperors, there were two sorts of *legati*, *consulares* and *prætorii*; the first of whom commanded whole armies, as the emperor's lieutenant-generals; and the others, only particular legions.

LEGEND, any idle or ridiculous story told by the romanists concerning their saints, and other persons, in order to support the credit of their religion.

The legend was originally a book used in the old romish churches, containing the lessons to be read at divine service: hence the lives of the saints and martyrs came to be called legends, because chapters were read out of them at matins, and in the refectories of religious houses. Among these the golden legend, which is a collection of the lives of the saints, was received by the church with great applause, which it maintained for two hundred years; though it is so full of ridiculous and romantic stories, that the romanists themselves are now ashamed of it.

But besides these written legends, there are others which may be called *traditionary*: these are those idle stories with which every traveller is entertained in his passage through popish countries. Thus at Mentz, in Germany, they relate, that a drunken man swore that he would kill the first man he met, and a crucifix coming by, he struck at it with his sword, which drew blood from the crucifix; and to heighten the wonder, they add, the fellow immediately sunk up to the knees in the ground, where he stood till he was apprehended by the magistrates.

LEGER-LINE, in music, one added to the staff of five lines, when the ascending or descending notes run very high or low: there are sometimes many of these lines both above and below the staff, to the number of four or five.

LEGGIARDO, or **LEGGIARDAMENTE**, in music, signifies to play or sing in a lively, brisk, and gay manner.

LEGHORN, or **LIVORNO**, a port-town of Italy, in the dutchy of Tuscany, situated on the Tuscan sea, forty miles west of Florence: east long. 11° , north lat. $43^{\circ} 30'$.

LEGION, in roman antiquity, a body of foot which consisted of ten cohorts.

The exact number contained in a legion, was fixed by Romulus at three thousand; though Plutarch assures us, that after the

reception of the Sabines into Rome, he encreased it to six thousand. The common number afterwards, in the first times of the free state, was four thousand; but in the war with Hannibal, it arose to five thousand, and after this it is probable that it sunk again to four thousand, or four thousand two hundred, which was the number in the time of Polybius.

They borrowed their names from the order in which they were raised, as *prima*, *secunda*, *tertia*; but because it usually happened that there were several *primæ*, *secundæ*, &c. in several places, they, on that account, took a sort of surname besides, either from the emperors who first constituted them, as *Augusta*, *Claudiana*, *Galbiana*; or from the provinces which had been conquered chiefly by their valour, as *Parthica*, *Scythica*, *Gallica*, &c. or from the names of the particular deities, for whom their commanders had an especial honour, as *Minervia* and *Apollinaris*; or from the region where they had their quarters, as *Cretensis*, *Cyrenaica*, *Britannica*, &c. or sometimes upon account of lesser accidents, as *Adjutrix*, *Martia*, *Fulminatrix*, *Rapax*, &c. See **COHORT**, **MANIPULUS**, &c.

LEGISLATOR, a law-giver, or person who establishes the polity and laws of a state. Such was Moses, among the Jews; *Lycurgus*, among the Lacedæmonians, &c.

With us, the legislative power is lodged in the king, lords, and commons assembled in parliament. See **PARLIAMENT**.

LEGITIMATION, an act whereby illegitimate children are rendered legitimate. See the article **BASTARD**.

LEGUME, *legumen*, among botanists, denotes a pericarpium of an oblong compressed figure, formed of two valves, joined by a visible suture both on the upper and under parts, and having the seeds affixed to the upper limbs of the two valves, in an alternate order.

LEGUMINOUS, an appellation given to all plants whose fruit is a legume. See the preceding article.

LEICESTER, the county-town of Leicestershire, sends two members to parliament: west long. $1^{\circ} 5'$, and north lat. $52^{\circ} 40'$.

LEIGH, a market-town thirty-two miles south-east of Lancaster.

LEIGHTON BUZZARD, a market-town of Bedfordshire, fifteen miles south of Bedford.

LEIN.

LEININGEN, a town of Germany, seventeen miles south of Worms.

LEINSTER, a province of Ireland, the capital of which is Dublin.

LEIPSIC, a rich and populous city of Germany, in the circle of Upper Saxony, and province of Misnia: east long. $12^{\circ} 40'$, north lat. $51^{\circ} 20'$.

LEITH, a port-town of Scotland, about two miles north of Edinburgh.

LEMBURG, LEOPOLIS, a city of Poland, and capital of the province of Red Russia: east long. 24° , north lat. 49° .

LEMGOW, a town of Westphalia, twenty miles north of Paderborne.

LEMING, in zoology, the short-tailed mus, with the body variegated with black and tawney, being the same with the Norway-rat. See NORWAY and MUS.

LEMMA, in mathematics, a proposition which serves previously to prepare the way for the more easy apprehension of the demonstration of some theorem, or construction of some problem.

LEMNA, DUCKWEED, in botany, a genus of the cryptogamia class of plants, producing distinct hermaphrodite and female flowers; neither of which have any flower petals: the stamina are two subulated filaments; and the fruit is a globose, unilocular capsule.

LEMNOS, an island of the Archipelago, situated forty miles south-west of the entrance of the Hellespont: east long. 26° , north lat. 29° .

It is remarkable for producing the bole called lemnian earth, which is a good astringent and vulnerary. See BOLE.

LEMON, *limon*, in botany, a tree comprehended by Linnæus among the citrons. See the article CITRUS.

The medicinal virtues of lemons are the same with those of oranges, only in a greater degree. See ORANGE.

LEMONADE, a liquor prepared of water, sugar, and lemon or citron juice: it is very cooling and grateful.

LEMSTER, a borough-town of Herefordshire, twelve miles north of Hereford.

LEMURIA, a festival of the ancient Romans, solemnized on the ninth of May, to pacify the manes of the dead, who were the lemures or phantoms that came in the night to torment the living. The chief ceremony of this festival was as follows: about midnight, the person who offered it, being barefooted, made a signal, by joining the fingers of his hand to his thumb, which he fancied kept off the bad spirit or phantom: he then wash-

ed his hands in spring-water, and putting black beans into his mouth, threw them behind him, uttering these words, *I deliver myself and mine by these beans*: he then made a great noise with brass-kettles and pans, desiring the ghost nine times to depart from his house; with which the ceremony ended. The celebration of the lemuria lasted three nights, during which time the temples of the gods were shut up, and no marriages were allowed to be celebrated.

The institution of this festival is ascribed to Romulus, who, to rid himself of the ghost of his brother Remus, which was perpetually appearing to him, ordained a feast to pacify it; whence it is likewise called remuria.

LENA, a great river of Siberia, running north from north lat. 55° to 72° .

LENÆA, *Anvata*, in antiquity, a festival of Bacchus, surnamed Lenæus from *ληναι*, i. e. a vine-press. Besides the usual ceremonies at feasts sacred to this god, it was remarkable for poetical contentions, and tragedies acted at this time.

LENCICIA, a city of great Poland, seventy miles west of Warsaw.

LENITIVE MEDICINES, among physicians, those of a mild, softening, and relaxing nature, and destitute of all acrimony.

LENS, in dioptrics, properly signifies a small roundish glass, of the figure of a lentil; but is extended to any optic glass, not very thick, which either collects the rays of light into a point, in their passage through it, or disperses them further apart, according to the laws of refraction.

Lenses have various figures, that is, are terminated by various surfaces, from which they acquire various names. Some are plane on one side, and convex on the other, as that marked A, in plate CLV. fig. 3. n^o 1. others convex on both sides, as B, *ibid.* both which are ordinarily called convex lenses: though where we speak accurately, the former is called plano-convex. Again, some are plane on one side, and concave on the other, as C, *ibid.* and others are concave on both sides, as D, *ibid.* which are both usually ranked among the concave lenses; tho' when distinguished, the former is called a plano-concave. Others, again, are concave on one side, and convex on the other, as E, *ibid.* which are called convexo-concave, or concavo-convex lenses.

lenses, according as the one or the other surface is more concave, or a portion of a less sphere. It is here to be observed, that in every lens terminated in any of the forementioned manners, a right line, GH , perpendicular to the two surfaces, is called the axis of the lens; which axis, when both surfaces are spherical, passes through both their centers; but if one of them be plane, it falls perpendicularly upon that, and goes through the center of the other.

For convex lenses, the laws of their refraction, and their effects depending thereon, are as follow:

A ray of light EG (*ibid.* n^o 2.) near the axis and parallel thereto, striking on the plane surface of a plano-convex lens, directly opposite to the luminous body; after refraction concurs with the axis in the point F ; and if C be the center of the convexity, CF will be to CL ; that is, the distance of the center from the point of concurrence or focus, will be to the distance of the center from the convex surface in the ratio of the refraction.

For the plane surface being directly opposed to the luminous body, the ray EG is perpendicular to AB , and therefore will pass unrefracted to H ; thus it strikes on AHB still parallel to the axis; and therefore coming out of a denser medium into a rarer, will meet the axis of the lens in F , and so as that CF will be to CL in the ratio of the sine of the refracted angle to the sine of the angle of inclination, as will be demonstrated under the article REFRACTION.

If then the refraction be out of a glass-lens into air, $CF : CL :: 3 : 2$, and therefore $FL = 2 CL$. that is, parallel rays near the axis will concur with it at the distance of the diameter. Again, if the refraction were out of a water-lens, *i. e.* out of a plano-convex lens filled with water, $CF : CL :: 4 : 3$, and therefore $FL = \frac{4}{3} CL$, *i. e.* parallel rays near the axis will concur with it at the distance of half the diameter. So that if a lighted candle be placed in the focus of a plano-convex lens, that is, in the point F , distant from the surface of the lens ALB , by the length of the diameter, and from the surface of the water lens by half the diameter, its rays after refraction will become parallel. See the article REFRACTION.

If the ray KI (*ibid.* n^o 3.) near the axis of a plano-convex lens, and parallel thereto, strike on its convex sur-

face AHB , after a double refraction it will meet the axis in F ; so as that HG will be to GC , and GE to FH in the ratio of the refraction.

For the ray KI , parallel to the axis EG , by virtue of the first refraction in I , will tend to the point G , so as GH will be to GC in the ratio of the sine of the angle of inclination to the sine of the refracted angle: therefore by virtue of the second refraction in L , it will concur with the axis in F , so as GD will be to FD in the ratio of the sine of the refracted angle, to the sine of the angle of inclination: so that the semidiameter and thickness of the plano-convex lens, with the ratio of refraction, being given, hence arises a method of determining the focus of parallel rays striking on the convex surface. Hence, if the lens be glass, $FD = 2 CH - \frac{2}{3} HD$. So that if two-thirds of the thickness of the lens be inconsiderable (as in practice it usually happens) parallel rays meet with the axis at the distance of the diameter from the lens, even when they strike on the convex surface.

So that as to the place of the focus, 'tis the same thing whether the plane surface or the convex one be turned to a luminary of parallel rays; though it appears both from experience and trigonometrical calculation, that there are more rays united in a less space, if the convex surface, than if the plane one be turned towards the sun. If the lens were full of water, $FD = 3 CH - \frac{3}{4} HD$. Wherefore, if $\frac{3}{4} HD$ be inconsiderable, $FD = 3 CH$; or if $\frac{1}{4} HD$ be inconsiderable, $FH = 3 CH$. Parallel and near rays, therefore, are united at the distance of half the diameter, if the refraction be in water, even when the convex surface is opposed to the luminous body. Hence also arises a method of determining the focus of parallel rays striking on a lens convex on both sides, the two semidiameters and the thickness of the lens being given. On these principles is founded the structure of refracting burning-glasses; the sun's light and heat being exceedingly augmented in the focus of a lens, whether convex or plano-convex; since the rays falling parallel to the axis of the lens are reduced into a much narrower compass, so that 'tis no wonder they burn some bodies, melt others, and produce other extraordinary phaenomena.

If a luminous body be placed in the focus behind a lens, whether plano-convex, or convex on both sides, or whether equally

equally or unequally, the rays after refraction become parallel. Hence by means of a convex lens, or a little glass bubble full of water, a very intense light may be projected to a vast distance.

And this furnishes us with the structure of a lamp or lantern, to project an intense light to an immense distance: for a lens convex on both sides, being placed opposite to a concave mirror; if in the common focus of both be placed a lighted candle or wick, the rays reflected back from the mirror to the lens will be parallel to each other, and after refraction will converge, till they arrive at the distance of the semi-diameter, after which they will again diverge. But the candle being likewise in the focus of the lens, the rays it throws on the lens will be parallel: and therefore a very intense light, meeting with another equally intense, at the distance of the diameter from the lens, the light will be surprising; and tho' it afterwards decrease, yet the parallel and diverging rays going a long way together, it will be very great at a very great distance. Lanterns of this kind are of considerable service in the night-time to discover remote objects, and are used with success by fowlers and fishermen, to gather their prey together, in order to take them.

If the luminous body, placed in the focus, be of a large extent, the rays flowing from points sensibly distant from each other, cannot be parallel; but will constitute several trains, or pencils of rays, parallel to each other.

The images of objects, opposed in any manner to a convex lens, are exhibited invertedly in its focus. Hence, if a paper be applied to a convex lens (especially in a dark room) at the distance of its focus, the images of objects shining upon it will be represented distinctly, and in their natural colours, thereon: nor is the focus of the sun's rays any thing else, in effect, but the image of the sun. Hence, in solar eclipses, the sun's image, eclipsed as it is, may be burned by a large lens on a board, &c. a very entertaining phenomenon.

Hence also, if a convex lens of any kind be exposed both to nearer and remoter objects, and a paper at the same time applied, so as to receive the images of objects distinctly, the distance of the focus from the lens, and thence the diameter of the convexity, may be determined.

If a concave mirror be so placed, as that an inverted image formed by refraction through a lens be found between the center and the focus, or even beyond the center, it will again be inverted by reflection, and so appear erect; in the first case beyond the center, and in the latter between the center and the focus. On these principles is built the camera obscura. The diameter of the image of an object delineated beyond a convex lens, is to the object itself in the ratio of the distance of the image, to that of the object.

Since then the image of a remoter object is less distant from the lens than that of the nearer, the image of the more remote will be less than that of the nearer. And because the distance of the image from the lens is greater, if the lens be a segment of a greater sphere than of a less, the image will likewise be greater in the former case than in the latter. The image therefore will be of such a magnitude, as it would be of, were the object to shine into a dark room through a little hole upon a wall, at the same distance from the hole, at which the focus is from the lens. When an object is less distant from a lens than the focus of parallel rays, the distance of the image is greater than that of the object; otherwise the distance of the image is less than that of the object: in the former case, therefore, the image is greater than the object, in the latter less. If the images be made greater than the objects, they will not appear distinctly; because in that case there are fewer rays which meet after refraction in the same point: whence it happens, that rays proceeding from different points of an object, terminate in the same point of an image, which is the cause of confusion. Hence it appears, that the same aperture of a lens may not be admitted in every case, if we would keep off the rays which produce confusion. However, though the image is then most distinct, when no rays are admitted, but those near the axis, yet for want of rays the image is apt to be dim. If the eye be placed in the focus of a convex lens, an object viewed thro' it appears erect and enlarged, in the ratio of the distance of the object from the eye, to that of the eye from the lens, if it be near; but infinitely, if remote.

For concave lenses, their laws are as follow:

If parallel rays strike on a plano-concave lens KL (*ibid.* n^o 4.) and FC be to FB in the ratio of the refraction, the rays will diverge from the axis, and the point of divergency or dispersion, called the virtual focus, will be F . For the ray HI , parallel to the axis, is perpendicular to KL , and will therefore pass unrefracted to E . Wherefore FC being to FB in the ratio of refraction, F will be the virtual focus. See FOCUS.

If then the lens be glass, $FB = 2BC$; *i. e.* the virtual focus F will be distant from the lens KL a diameter and a half $3BC$. If the ray AE , (*ibid.* n^o 5.) parallel to the axis FP , strike on a lens concave on both sides; and both FC be to FB , and IP to PH in the ratio of refraction; and $FP : PH :: FB : BG$; G will be the point of dispersion, or the virtual focus. If therefore the refraction be in a glass-lens, the sums of the semidiameters CB and HI , will be to the diameter of the concavity of either, $2HI$; as the semidiameter of the other, CB , to the distance of the virtual focus from the lens BG . Hence the sun's rays striking on a concave lens, their light after refraction will be considerably weakened; so that the effect of concave lenses, is opposite to that of convex ones.

Lastly, an object viewed thro' a concave lens appears erect, and diminished in a ratio compounded of the ratios of the space in the axis, between the point of incidence and the point to which an oblique ray should pass without refraction, to the space of the axis between the eye and the middle of the object; and the space in the same axis between the eye and the point of incidence, to the space between the middle of the object and the point the oblique ray would pass to without refraction.

Though the properties of lenses have been considered here principally with regard to rays falling near the axis, and parallel thereto; yet the reasoning will be easily transferred to rays more remote from the axis, and falling in any direction. Thus we may say universally, that in a convex lens all parallel rays become converging, and concur in a focus; that diverging rays either become less diverging, or run parallel, or converge; and that converging rays, converge the more: all which alterations are more sensible in oblique rays than in perpendicular ones, by reason the angles of incidence in that case are greater.

In concave lenses all parallel rays become diverging; diverging rays diverge more; converging rays either converge less, or become parallel, or go out diverging: all which things hold of oblique, as well as direct rays, but more sensibly in the first.

A lens, one of whose surfaces is convex, and the other concave is called a *meniscus*. Some confine lenses within the diameter of five or six lines, and will have such as exceed that diameter called lenticular glasses.

Lenses are distinguished with regard to their preparation, into ground and blown. Blown lenses are little globules of glass melted in the flame of a lamp or taper; but the figure of these is seldom exact; besides that the smoke of the lamp cleaves to the surface in melting: on both which accounts, they come short of the clearness of those which are ground. See the articles GRINDING and POLISHING.

For the method of determining the foci of different lenses, see FOCUS.

LENS is also a town of the french Netherlands, eight miles north of Arras.

LENT, a solemn time of fasting in the christian church, observed as a time of humiliation before Easter, the great festival of our Saviour's resurrection.

Those of the romish church, and some of the protestant communion, maintain, that it was always a fast of forty days, and as such, of apostolical institution. Others think it was only of ecclesiastical institution, and that it was variously observed in different churches, and grew by degrees from a fast of forty hours, to a fast of forty days. This is the sentiment of Morton, bishop Taylor, du Moulin, Dailleé, and others.

If this fast was of apostolical institution, it is scarce accountable how such a variety in point of time should happen in the observation of it; some churches keeping it only three weeks, some six, some seven, and yet none of them hitting upon the precise number of forty days. It is observable however, that they all agreed in calling this fast quadragesimal, and assigned different reasons for it; and that Ash-wednesday, and the other three days were not added by the romish church to the beginning of lent, till the seventh or eighth century. The manner of observing lent among those who were piously disposed, was to abstain from food till evening, their only refreshment was a supper, and then it

was

was indifferent whether it was flesh or any other food, provided it was used with sobriety and moderation.

Lent was thought the proper time for exercising, more abundantly, every species of charity. Thus what they spared from their own bodies by abridging them of a meal, was usually given to the poor: they employed their vacant hours in visiting the sick, and those that were in prison, in entertaining strangers, and reconciling differences. The imperial laws forbade all prosecution of men in criminal actions, that might bring them to corporal punishment and torture, during the whole season. This was a time of more than ordinary strictness and devotion, and therefore in many of the great churches they had religious assemblies for prayer and preaching every day. All public games and stage-plays were prohibited at this season; as also the celebration of all festivals, birth-days, and marriages, as unsuitable to the present occasion.

The christians of the greek-church observe four lents: the first commences on the fifteenth of November, or forty days before Christmas: the second is the same with our lent: the third begins the week after Whitsuntide, and continues till the festival of St. Peter and St. Paul: and the fourth commences on the first of August, and lasts no longer than till the fifteenth. These lents are observed with great strictness and austerity; but on Saturdays and Sundays they indulge themselves in drinking wine and using oil, which are prohibited on other days.

LENTISCUS, the LENTISK-TREE, in botany, belongs to the same genus with the pistachia. See PISTACHIA.

Lentisk wood is esteemed astringent and balsamic, and accordingly recommended in the fluor albus and gonorrhœa. See FLUOR ALBUS and GONORRHOEA.

LEO, the LION, in zoology. See LION.

LEO, in astronomy, one of the twelve signs of the zodiac, the fifth in order; containing, according to Ptolemy, thirty-two stars; according to Tycho, thirty-seven; and, in the britannic Catalogue, there are no less than ninety-four.

The star called the lion's heart, cor leonis, regulus, and basilicus, is a fixed star of the first magnitude.

St. LEO, a town and bishop's see of Italy, twenty miles north-west of Urbino.

LEOMINSTER, or LEMSTER. See the article LEMSTER.

LEON, the capital of the province of Leon, in Spain, situated on the river Esla; west lon. $6^{\circ} 5'$, north lat. 43° .

LEON is also the capital of the province of Nicaragua, in Mexico, situated at the west end of the Lake Nicaragua; west long. 91° , north lat. $11^{\circ} 30'$.

St. LEONARD, a town of France, in the province of Guiennes, and territory of Limosin; east long. $1^{\circ} 45'$, north lat. $45^{\circ} 50'$.

St. LEONHART, a town of Germany, in the circle of Austria, and duchy of Carinthia; east long. 15° , north lat. 47° .

LEONINE VERSES, such as rhyme at every hemistich, the middle syllable of each verse corresponding to the last one.

LEONTICE, in botany, a genus of the hexandria-monogynia class of plants, the flower of which consists of six oval petals; and the fruit is a large, globose, annulated and unilocular capsule, containing a few seeds of the same figure.

LEONTINI, a town of Sicily, twenty miles north-west of Syracuse.

LEONTODON, DANDELION, in botany, a genus of the syngenesia-polygamia class of plants, the compound flower of which is imbricated and uniform; and the partial ones, monopetalous and ligulated: the stamina are five scarcely discernible capillary filaments: the seed, which is solitary, is contained in the cup of each partial flower, or corollula.

Dandelion is said to have much the same virtues with endive. See ENDIVE.

LEONURUS, LION'S TAIL, in botany, a genus of the didynamia gymnospermia class of plants, the flower of which is monopetalous and rinate; and its seeds, which are four in number, are contained in the bottom of the cup.

LEOPARD, a beast of prey, with the spots on the upper part of the body round, and the lower ones virgated. It is a very nimble, as well as fierce animal, so that scarce any thing escapes it.

Authors call the male pardus, and the female panthera.

LEOPARD'S BANE, *doronicum*, in botany. See the article DORONICUM.

LEOPOLSTAT, a city of Upper Hungary, subject to the house of Austria; east long. $18^{\circ} 6'$, north lat. $48^{\circ} 55'$.

LEPANTO, a port-town of european Turkey, eighty miles west of the isthmus of Corinth; whence the gulph of Lepanto takes its name.

LEPASTRUM, in natural history, a genus of selenitæ, composed of plates disposed in

in the form of a radiated star. See the article SELENITÆ.

LEPIDIUM, DITTANDER, in botany, a genus of the tetradynamia-siliculosa class of plants, with a tetrapetalous cruciform flower: the stamina are six subulated filaments; and the fruit is a compressed bilocular pod.

LEPIDOPTERA, in zoology, an order of insects, with four wings, which are covered with imbricated squamulæ; add to this, that the mouth is commonly spiral.

Under this order are comprehended the butterflies, and phalenæ, or moths.

LEPIUM, in natural history, a genus of fossils of the harder gypsum, composed of very small particles, and of a less glittering hue. See the article GYPSUM.

There is only one species of this genus, being one of the least valuable and most impure of the class of gypsums. It is of an extremely rude, irregular, coarse and unequal structure; a little soft to the touch, of a very dull appearance, and of different degrees of a greyish white. It is burnt in plaister for the coarser works; it calcines very slowly and unequally, and makes but a very coarse and ordinary plaister.

LEPROSO AMOVENDO, an ancient writ for removing a person infected with the leprosy, who forced himself into the company of his neighbours, either in a church, or at some public meeting.

LEPROSY, *lepra*, a foul cutaneous disease, appearing in dry, white, thin, scurfy scabs, either on the whole body, or only some part of it, and usually attended with a violent itching and other pains.

The leprosy is said to be of two kinds, that of the Arabians, called elephantiasis, from the roughness, inequalities, and tubercles of the skin, resembling that of an elephant; and that of the Greeks, called impetigo. See ELEPHANTIASIS.

Lucretius supposed the elephantiasis to be generated in Egypt, and no where else; but if the leprosy of the jews is the same as that of the negroes, which is highly probable; then it may be affirmed, that it is endemical to the southern and inland parts of Africa. That it was contagious all histories sacred and prophane agree. Pliny acquaints us, that it did not invade Italy till the time of Pompey the Great, and that it was brought from Egypt, and is peculiar to that kingdom. Some have thought that the leprosy of the

Arabians, or more properly of the Africans, was the parent of the lues venerea; however that be, it is certain, that since the pox has been curable, the elephantiasis seems to have disappeared, and the leprosy of the Greeks has been much less frequent than before.

Pliny informs us, that the first appearance of the elephantiasis is in the face, particularly a small speck appears on the nose or nostril, and as the disease increases, the whole body is full of spots of various colours; the skin is thick in one place, and thin in another; hard and rough with scabs. In process of time, the skin turns black, and eats away the flesh to the very bones; then the body, Celsus observes, falls away, the mouth legs and feet swell, and the fingers and toes are hid with a swelling; even the bones themselves do not escape; afterwards a fever arises, to which the patient falls an easy victim.

This leprosy has made great progress of late years in Barbadoes, not only among the negroes, but the white inhabitants, Towne says, that at first there appears spots of a brown copper-colour, dispersed over several parts of the face, but especially on the nose, without any uneasiness or sense of pain at the beginning: these spread by slow degrees, till a great part of the body is covered with them.

There is another disease which Towne falsely calls the elephantiasis, which generally happens after long illness, acute fevers, obstinate intermittents, or other tedious distempers; the vitiated humours generally subsiding into one leg, sometimes into both, imitating an anasarca. As the leg becomes more tumified, the veins are distended with various swellings from the knee to the toes: then the skin begins to grow rugged and unequal, its vascular and glandular compages are enlarged, and a scaly substance with a sort of chaps and fissures in the interitices appear on the surface: these seeming scales do not dry up, but are protruded forward, and stretched in their dimension till the leg is enlarged to an enormous bulk.

Hoffman thinks the seat of these diseases is in the skin, but chiefly the fatty membrane thereof, where the fomes of the impure and corrupt matter chiefly resides; inso-much that by corroding, pricking, and inflaming the nervous fibrillæ of the skin, various kinds of pustles are generated.

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This disease is hereditary and infectious; for it may be caught by the saliva of a leper, if a sound person drinks after him, by touch, by lying in the same bed, and by coition.

An inveterate leprosy was judged to be absolutely incurable; but Artæus says, when the disease is new and recent, there are great hopes of a cure. What he and Celsus prescribe in order to the cure is not worth repeating; for if any medicines will do, they must be of the herculean kind. Authors are excessive in the praise of viper's flesh, which Hoffman judges to be quite insignificant. Joel advises bleeding, and purging with twelve grains of the extract of black hellebore, or three grains of the glass of antimony, in conserve of roses: but the vitrum ceratum is more safe, and may be given in a larger dose. Towne confesses, that the antimonial preparations yielded most relief in Barbadoes, but he could not say that they perfected the cure. On the other hand, mercury exasperated the distemper, irritated the ulcers, and made them spread the faster.

The impetigo or leprosy of the Greeks, begins with red pimples or pustles breaking out in various parts of the body; sometimes they appear single, sometimes a great number arise together, especially on the arms and legs. As the disease increases, fresh pimples arise, which joining the former, make a sort of cluster, all which enlarge their borders, and spread in an orbicular form. This leprosy, according to Turner, breaks out first in the elbows and knees, but soon spreads farther, and gradually shews itself over all the body. The causes and seat of this disease are said to be the same as the former. Willis blames all dried and salted meats; especially hog's flesh, and fish, particularly shell-fish; because the poor people in Cornwall inhabiting near the sea-coast, were formerly much subject to leprous diseases, and had many hospitals erected on that account.

In the method of cure, says Hoffman, we should endeavour to discharge out of the body the mass of corrupt glutinous and acrid humours, by sufficient bleeding, and abstinence, by purges, as well gentle as drastic, then by proper aliment, and a good regimen, promote the generation of wholesome juices; and likewise by external, deterfive, consolidating and drying remedies, to free the part from pain, tumours, itching, and

ulcers. The purges may consist of the root and the resin of jalap, the extract of black hellebore, elaterium mixt with calomel, or ethiops mineral, and gum ammoniac. Among those things which stimulate the parts to an excretory motion, and more powerfully melt down the tenacious humours, the wood and bark of guaiacum exceed all others: the most considerable besides these, are the tartarized and acrid tincture of antimony, sulphur of antimony, cinnabar, and if a venereal taint is suspected, a decoction of crude antimony; which medicines in a convenient dose in the morning, with purifying decoctions drank in bed, afford great relief. But if these fail, recourse must be had to mercury, which some, after extinction, mix with flowers of sulphur and camphire, and rub it on the joints to promote a salivation. Others more properly give mercurius dulcis, with double the quantity of crab's-eyes, and calx of antimony, rising gradually from three or four grains, to a scruple, in order to salivate with proper precautions. See SALIVATION.

LEPTODECORHOMBES, in natural history, a genus of fossils of the order of the selenitæ; consisting of ten planes, each so nearly equal to that opposite to it as very much to approach to a decahedral parallelopiped, though never truly or regularly so. Two of the planes in this genus, which may properly enough be called the top and bottom are ever broader and flatter than the rest, and these, tho' not regularly equal, usually answer one another very nearly, as also do the other eight in two sets of fours. There are four shorter planes meeting in somewhat acute angles, two and two, from the ends, or two shorter edges of the two flat and broad rhomboidal planes, called the top and bottom; and four longer meeting in more obtuse angles from the sides, or longer edges of the same rhomboidal planes. As the broader and flatter planes, or the top and bottom, in this genus are not regularly equal to each other, so neither are the eight narrower to their opposites, but there are usually differences both in their angles, and in the breadth of them. See the article SELENITÆ.

Of this genus there are only five known species. 1. A thin, fine, pellucid, and slender streaked one, with transverse striæ, found in considerable quantities in the strata of clay in most parts of England, particularly near Heddington in Oxfordshire.

shire. 2. A thin, dull-looking, opaque, and slender streaked one, more scarce than the former, and found principally in Leicestershire and Staffordshire.

3. A thin fine streaked one, with longitudinal striæ, found in the clay-pits at Richmond, and generally lying at great depths. This has often on its top and bottom a very elegant smaller rhomboide, described by four regular lines. 4. A rough kind with thick transverse striæ, and a scabrous surface, very common in Leicestershire and Yorkshire. And, 5. a very short kind, with thick plates, common in the clay-pits of Northamptonshire and Yorkshire.

LEPTOPOLYGLINGLIMI, in natural history, a name which Dr. Hill gives to a genus of fossil-shells, distinguished by a number of minute teeth at the cardo; whereof we find great numbers at Harwich cliff, and in the marle-pits of Sussex.

LEPTURA, in zoology, a genus of winged insects, the antennæ whereof are oblong, slender and setaceous, the exterior wings are truncated at their extremity, and the thorax is of a subcylindric figure. See the article **INSECTS**.

LEPUS, the **HARE**, in zoology. See **HARE**.

LEPUS, in astronomy, a constellation of the southern hemisphere; comprehending 12 stars, according to Ptolemy; 13, according to Tycho; and 19, in the Britannic Catalogue.

LERIA, a city and bishop's see of Portugal: west longitude $9^{\circ} 15'$, and north latitude $39^{\circ} 30'$.

LERIDA, a city and bishop's see of Catalonia, in Spain: east longitude $5'$, north latitude $41^{\circ} 20'$.

LERINS, two islands on the coast of Provence, five or six miles south of Antibes, called St. Margaret and St. Honorat.

LERNEA, the **SEA-HARE**, in zoology, a sea-insect of the order of the gymnarthria, the body of which is of an oblong cylindric figure, and is perforated in the forehead; the tentacula resemble ears. See the article **GYMNARTHRIA**.

LE ROY LE VEUT, the king's assent to public bills. See the articles **BILL**, **STATUTE**, and **PARLIAMENT**.

LESBOS, or **METELIN**, an island of the Archipelago, sixty miles north-west of Smyrna. Its chief town is Castro.

LESCAR, a city and bishop's see of France, forty miles east of Bayonne.

LESKARD, a borough-town of Cornwall, fifteen miles west of Launceston, which

sends two members to parliament.

LESSINES, a town of the Austrian Netherlands, fourteen miles north of Mons.

LESSONS, among ecclesiastical writers, portions of the holy scriptures, read in christian churches, at the time of divine service.

In the antient church, reading the scriptures was one part of the service of the catechumens, at which all persons were allowed to be present, in order to obtain instruction.

The church of England, in the choice of lessons, proceeds as follows: for the first lesson on ordinary days, she directs, to begin at the beginning of the year with Genesis, and so continue on, till the books of the Old Testament are read over, only omitting the Chronicles, which are for the most part the same with the books of Samuel and Kings, and other particular chapters in other books, either because they contain names of persons, places, or other matters less profitable to ordinary readers.

The course of the first lessons for Sundays is regulated after a different manner. From Advent to Septuagesima Sunday, some particular chapters of Isaiah are appointed to be read, because that book contains the clearest prophecies concerning Christ. Upon Septuagesima Sunday Genesis is begun, because that book which treats of the fall of man, and the severe judgment of God inflicted on the world for sin, best suits with a time of repentance and mortification. After Genesis, follow chapters out of the books of the Old Testament, as they lie in order; only on festival Sundays, such as Easter, Whitsunday, &c. the particular history relating to that day is appointed to be read; and on the Saints-days, the church appoints lessons out of the moral books, such as Proverbs, Ecclesiastes, Ecclesiasticus, &c. as containing excellent instructions for the conduct of life.

As to the second lessons, the church observes the same course both on Sundays and week days: reading the gospels and Acts of the Apostles in the morning, and the epistles in the evening, in the order they stand in the New Testament: excepting on saints-days and holy-days, when such lessons are appointed, as either explain the mystery, relate the history, or apply the example to us.

LESSOR, and **LESSEE**, in law. See **LEASE**.

LESTWITHIEL, a borough-town of Cornwall,

Cornwal, twenty-three miles south-west of Launceston, which sends two members to parliament.

LET FALL, a word of command at sea, to put out a sail when the yard is aloft, and the sail is to come or fall down from the yard; but, in strictness, is only applied to the main and fore-courses, when their yards are hoisted up.

LETHARGY, in medicine, a disease wherein such a profound drowsiness or sleepiness attends the patient, that he can be scarce awaked, and, if awaked he remains stupid, without sense or memory, and presently sinks again into his former sleep. The lethargy has some affinity to the apoplexy and palsy, and often attends them. In these sleepy disorders, there is sometimes a fever, and sometimes none. The immediate cause of them is a very languid and diminished influx of the animal spirits from the cortical part of the brain into the medulla oblongata, and from thence into the nerves destined for sense and motion. See the article **APOPLEXY**.

There are several kinds of these disorders, but the principal are a coma vigil, a coma somnolentum, a carus, and a lethargy. See **COMA VIGIL**, **COMA SOMNOLENTUM**, and **CARUS**.

A lethargy then, properly so called, is attended with a fever, which is a symptom thereof, and is chiefly discovered by the frequency of the pulse, whereas a carus is often a symptom or consequence of a fever. It does not invade so suddenly as an apoplexy. It is never without danger, but that is the worst which is attended with a tremor of the limbs, and a cold sweat of the face.

The causes of a lethargy are the same as of a coma somnolentum, but more violent. The cause proceeds from an obstruction of the passage of the nervous fluid, from the cortical part to the medulla oblongata, as was already observed: such is, 1. Too great a relaxation of the blood-vessels in the brain, which retards the circulation, and happens to plethoric old men. 2. A difficult circulation of the blood through the head, especially when thick and impure: hence plethoric, scorbutic and hypochondriac persons, are frequently drowsy, especially when there are spasms in the abdomen: hence children troubled with worms are sleepy, because the blood is forced too plentifully to the head: hence the profound sleep of plethoric persons, when

intoxicated, may be accounted for, which when caused by excess of spirituous liquors is often fatal. 3. An excessive collection of serum in the brain, and its membranes, and an extravasation thereof; the suppression of the running of the ears, a coryza and ulcers will cause a lethargy, or coma somnolentum, and either of them immediately follows a suppression of urine.

Among the remote causes of these diseases may be reckoned a cacochymic, cachectic, and scorbutic habit of body; a debility from grief, tedious diseases, great loss of blood, abuse of intoxicating liquors, frequent surfeits, breathing a dense vapid air, a moist cloudy season, westerly winds, the winter-season, and an abuse of tobacco: likewise a suppression of the hæmorrhoids, menses, or any usual hæmorrhage, or any customary evacuation, too long an absence of the gout, and the like, will occasion these disorders.

In the cure of these diseases, says Hoffman, three intentions should chiefly be regarded: 1. To raise the patient from sleep. 2. To remove the difficulty of circulation, and the stagnation or extravasation of the blood or serum in the head. 3. To restore the strength of the membranes and vessels of the brain. Those remedies are efficacious, in the first case, which act on the nervous parts, by inducing a tremulous and oscillatory motion through the whole nervous system; such as powerful acids mixed with tincture of castor, &c. volatile salts, fetid things, as galbanum, burnt partridges feathers, cold water thrown on the head, cataplasms made with vinegar, rue, bay-leaves, tops of savory, mustard-seed, castor, and camphire, applied to the head, forehead, and temples. The serous colluvies is derived from the head by sternutatories; the best is ten grains of salt of white vitriol, dissolved in half an ounce of marjoram-water, and drawn up the nose; blisters on the feet and neck; cupping-glasses, either with or without scarification; strong frictions on the lower parts; stimulating clysters, with the addition of sal gem, common salt, or the root of squills. To remove the stagnation, and promote the circulation, if the vessels are turgid with blood, venesection is necessary; then gentle laxatives and nervous medicines mixed with diaphoretics. A powder made of salt of hartshorn, salt of amber, cinnabar of antimony, and bezoar-mineral, has very great and salutary effects.

But to be more particular: the cure of the coma vigil we have given under that head, as also that of the coma somnolentum; only it may be farther observed, that a coma vigil, which accompanies a hemiplegia, is of longer continuance; and that its cure depends on curing the principal disorder. In the coma somnolentum, a red face, turgid with blood, indicates bleeding. Volatile spirits or salts should never be applied to the nose; but when sleepiness proceeds from a cold ferous cause, or when an erysipelas, miliary, or other eruptive matter is translated to the brain, here penetrating acids are useful. Sternutatories should not be used in the beginning of the disorder, if the person is plethoric, because they occasion a great afflux of humours to the head, whereby an apoplexy may be occasioned. A carus, especially the first species of it, requires plentiful bleeding, and the patient must be roused by clysters rendered stimulating with powder of squills; by blisters, by putting distilled vinegar into the nostrils, and by appeasing the orgasm of the fluids, with cooling fixed diaphoretics and acids: the second species requires but little or no assistance: and the third is incurable, especially if blisters fail.

LETHE, in the antient mythology, one of the rivers of hell, signifying oblivion or forgetfulness; its waters having, according to poetical fiction, the peculiar quality of making those who drank of them entirely forget every thing that was past.

LETRIM, or **LEITRIM**, a county of Ireland, in the province of Connaught; bounded by Fermanagh on the north, by Cavan on the east, by Roscommon on the south, and by Sligo on the west.

LETTER, a character used to express one of the simple sounds of the voice; and as the different simple sounds are expressed by different letters, these, by being differently compounded, become the visible signs or characters of all the modulations and mixtures of sounds used to express our ideas in a regular language. Thus, as by the help of speech we render our ideas audible; by the assistance of letters we render them visible, and by their help we can wrap up our thoughts, and send them to the most distant parts of the earth, and read the transactions of different ages. As to the first letters, what they were, who first invented them, and among what people they were first in use, there is still

room to doubt: Philo attributes this great and noble invention to Abraham; Josephus, St. Irenæus, and others, to Enoch; Bibliander, to Adam; Eusebius, Clemens Alexandrinus, Cornelius Agrippa, and others, to Moses; Pomponius Mela, Herodian, Rufus Festus, Pliny, Lucan, &c. to the Phœnicians; St. Cyprian, to Saturn; Tacitus, to the Egyptians; some, to the Ethiopians; and others, to the Chinese: but, with respect to these last, they can never be entitled to this honour, since all their characters are the signs of words, formed without the use of letters; which renders it impossible to read and write their language, without a vast expence of time and trouble; and absolutely impossible to print it by the help of types, or any other manner by the engraving, or cutting in wood. See the article **PRINTING**.

There have also been various conjectures about the different kinds of letters used in different languages; thus, according to Crinitus, Moses invented the hebrew letters; Abraham, the syriac and Chaldee; the Phœnicians, those of Attica, brought into Greece by Cadmus, and from thence into Italy, by the Pelasgians; Nicostрата, the roman; Isis, the egyptian; and Vulfilas, those of the Goths.

It is probable that the egyptian hieroglyphics were the first manner of writing; but whether Cadmus and the Phœnicians learned the use of letters from the Egyptians, or from their neighbours of Judea or Samaria, is a question; for since some of the books of the Old Testament were then written, they are more likely to have given them the hint, than the hieroglyphics of Egypt. But wheresoever the Phœnicians learned this art, it is generally agreed, that Cadmus, the son of Agenor, first brought letters into Greece; whence, in following ages, they spread over the rest of Europe.

Letters make the first part or elements of grammar; an assemblage of these compose syllables and words, and these compose sentences. The alphabet of every language consists of a number of letters, which ought each to have a different sound, figure, and use. As the difference of articulate sounds was intended to express the different ideas of the mind, so one letter was originally intended to signify only one sound, and not, as at present, to express sometimes one sound and sometimes another; which practice has brought a great deal of confusion into the languages,

guages, and rendered the learning of the modern tongues much more difficult than it would otherwise have been. This consideration, together with the deficiency of all the known alphabets, from their wanting some letters to express certain sounds, has occasioned several attempts towards an universal alphabet, to contain an enumeration of all such single sounds or letters, as are used in any language. See the article ALPHABET.

Grammarians distinguish letters into vowels, consonants, mutes, liquids, diphthongs, and characteristics. They are also divided into labial, dental, guttural, and palatal, and into capital and small letters. They are also denominated from the shape and turn of the letters; and in writing are distinguished into different hands, as round-text, german-text, round hand, italian, &c. and in printing, into roman, *italic*, and black letter. The term letter, or type, among printers, not only includes the CAPITALS, SMALL CAPITALS, and small letters, but all the points, figures, and other marks, cast and used in printing; and also the large ornamental letters, cut in wood or metal, which take place of the illuminated letters used in manuscripts. The letters used in printing are cast at the ends of small pieces of metal, about three quarters of an inch in length; and the letter being not indented, but raised, easily give the impression, when, after being blacked with a glutinous ink, paper is closely pressed upon it. See the article TYPE.

A fount of letters includes small letters, capitals, small capitals, points, figures, spaces, &c. but besides these they have different kinds of two-lined letters, only used for titles, and the beginning of books, chapters, &c. See the article FOUNT.

LETTER of attorney, in law, is a writing by which one person authorises another to do some lawful act in his stead, as to give seisin of lands, to receive debts, sue a third person, &c.

The nature of this instrument is to transfer to the person to whom it is given, the whole power of the maker, to enable him to accomplish the act intended to be performed. It is either general, or special; and sometimes it is made revocable, which is, when a bare authority is only given; and sometimes it is irrevocable, as where debts, &c. are assigned from one person to another. It is generally held, that the power granted to the attorney must be strictly pursued; and that where it is

made to three persons, two cannot execute it. In most cases, the power given by a letter of attorney determines upon the death of the person who gave it. No letter of attorney made by any seaman, &c. in any ship of war, or having letters of marque, or by their executors, &c. in order to empower any person to receive any share of prizes, or bounty-money, shall be valid, unless the same be made revocable, and for the use of such seamen, and be signed and executed before, and attested by, the captain and one other of the signing officers of the ship, or the mayor or chief magistrate of some corporation.

LETTERS-CLAUSE, or CLOSE LETTERS, are opposed to letters-patent, because they are commonly sealed up with the king's signet or privy-seal, while letters-patent are left open.

LETTERS of credit, among merchants, is a letter wrote by a merchant or banker, to his correspondent abroad, requesting him to credit the bearer as far as a certain sum. See the article CREDIT.

LETTER of licence, an instrument or writing granted by a person's creditors, allowing him a certain time for the payment of his debts; by which means he is enabled to prosecute his business, without fearing an arrest.

LETTER of mart, or *marque*, a letter granted to one of the king's subjects, under the privy seal, empowering him to make reprisals for what was formerly taken from him by the subjects of another state, contrary to the law of mart. See the article MARQUE.

Monitory LETTERS. See MONITORY.

LETTERS-PATENT, or OVERT, are writings sealed with the great seal of England, so called, because they are open with the seal affixed to them. These are granted to authorise a man, to do, or enjoy, what of himself he could not do. See the article PATENT.

Pacific LETTERS, *literæ pacificæ*, in church-history, testimonial letters given by the bishop, or chorepiscopus, to their priests, when they had occasion to travel abroad, certifying that the bearer was a catholic, and in communion with the church.

Paschal LETTER, a letter written by the pope to all metropolitans, to inform them on what day easter was to be celebrated.

LETTERE, a town of Italy, in the kingdom of Naples and hither Principate, situated on the gulph of Naples: east

longitude 15° , and north lat. $40^{\circ} 45'$.

LETTUCE, *lactuca*, in botany, a genus of the syngenesia-polygamia-æqualis class of plants, the compound flower of which is imbricated and uniform, with numbers of equal hermaphrodite-corollulæ shorter than the cup; the partial corolla is monopetalous, ligulated, truncated, and quadri or quinquedentated; it has no pericarpium; the cup is connivent and ovato-cylindric; the seed is single, ovated, acuminate and compressed. The common lettuce is generally sown for cutting very young, to mix with other salad herbs in spring; the cabbage lettuce is only this mended by culture: it may be sown at all times of the year; but in the hot months requires to be sown in shady borders. The cabbage-lettuce may also be sown at different seasons; to have a continuation of it through the summer. The first crop should be sown in February, in an open situation; the others, at three weeks distance, and the latter ones under covert, but not under the dripping of trees. The silesia, imperial, royal, black, white and upright cos-lettuces, may be sown first in the latter end of February or the beginning of March, on a warm light soil, and in an open-situation: when the plants are come up, they must be thinned to fifteen inches distance every way; they will then require no farther care, than the keeping them clear of weeds; and the black cos, as it grows large, should have its leaves tied together, to whiten the inner part. Succeeding crops of these should be sown in April, May, and June, and towards the latter end of August they may be sown for a winter crop, to be preserved under glasses, or in a bed arched over with hoops and covered with mats.

The most valuable of all the English lettuces, are the white cos, or the Versailles, the Silesia, and the black cos. The brown Dutch and the green capuchin are very hardy, and may be sown late, under walls, where they will stand the winter, and be valuable, when no others are to be had. The red capuchin Roman and prince-lettuces, are very early kinds, and are sown for variety, as are also the Aleppo-ones for the beauty of their spotted leaves.

The milk of the common garden-lettuces is hypnotic, while the root of the plant is cooling, diluent and nourishing.

LEVANT, a name given to the east part

of the Mediterranean sea, bounded by Natolia or the lesser Asia on the north, by Syria and Palestine on the east, by Egypt and Barca on the south, and by the island of Candia and the other part of the Mediterranean on the west.

LEVARI FACIAS, is a writ directed to the sheriff for levying a certain sum of money upon the lands, &c. of a person who has forfeited his recognizance. There is also a levari facias damna de disseisitoribus, which is for the levying of damages wherein the disseisor has been before condemned to the disseisee. There is likewise a levari facias residuum debiti, to levy the remainder of a debt, upon the lands, tenements, &c. of the debtor, when part has been satisfied.

LEVATOR, in anatomy, a name given to several muscles: as, 1. To two muscles of the anus; these arise on each side with a broad base, from the internal part of the os pubis, the tunic of the obturator internus, the internal part of the os ileum: and the acute process of the ischium: from these proceed fibres, in the manner of rays, running from a circumference to a center, directing their course toward the sphincter; and finally they unite in the hinder part of the intestine, which they surround, including at the same time the neck of the urinary bladder; the prostatae and the seminal vessels in men. and in women the vagina: they are, after this, inserted partly in the upper and hinder part of the sphincter, and partly confound and blend their fibres with those of the oval and annular kind, which form the sphincter; and from this course of their fibres it is evident, that they may serve not only for sustaining and elevating the anus, but to press the vesiculæ seminales and prostatae in the coitus. 2. Beside these, there are, according to Dr. Douglas, a pair of smaller levatores, which arise partly tendinous and partly fleshy, from the protuberance of the ischium; and are thence carried transversely toward the anus, and are inserted into its sphincter, near the bulb of the urethra. 3. The levatores costarum of Steno, and supra costales of Verheyen, which contribute to respiration, are of two kinds, distinguished, from their figure, into short and long: the short ones are twelve on each side; they have their origin from the transverse processes of eleven vertebrae of the back and of the lower one of the neck, and they are inserted obliquely into the hinder part of the ribs: the long ones are

are three or four ; their origin is the same from the seventh, eighth, ninth, tenth, eleventh, and twelfth ribs.

LEUCADENDRON, in botany, a genus of the tetrandria-monogynia class of plants, the general corolla of which is uniform and convex ; the partial one is oblong, hoary on the outside, and composed of two petals ; the upper petal is a long line or unguis, and its limb is lanceolated, undivided, and in its lower part is firmly joined to the lower petal ; the lower petal has also a long unguis of a linear figure, but three times as broad as that of the upper petal ; the cup, scarce at all altered, serves instead of a pericarpium, and contains a single roundish seed, coronated with hairs.

LEUCATE, a town of Languedoc, in France, fourteen miles south of Narbonne.

LEUCHTENBERG, a town of Germany, fifteen miles north-east of Amberg.

LEUCOIUM, the GREAT SNOW-DROP, in botany, a genus of the hexandria-monogynia class of plants, the corolla of which is of a rounded shape, patent, and divided into six plane oval petals, almost from the very base, and their tops somewhat thicker and narrower than their middles ; their fruit is a turbinated capsule, formed of three valves, and containing three cells ; the seeds are numerous and roundish. This is also the name whereby Tournefort calls the cheiranthus of Linnæus. See **CHEIRANTHUS**.

LEUCOMA, in surgery, a distemper of the eye, otherwise called albugo. See the article **ALBUGO**.

The causes of these blemishes or spots on the eye are various : they may arise, 1. from an obstruction of the pellucid vessels in the tunica cornea, and an inspissation of their contained juices, proceeding from a violent inflammation of the eye : or, 2. from a suppuration, and then an induration of these juices in the cornea after an inflammation, so that by degrees it becomes more opaque, as it hardens, and puts on a whitish hue, being sometimes mistaken for an unguis.

3. These spots may arise from an external erosion or ulcer in the cornea. Or, 4. from pustules or vesiculæ in various inflammatory disorders, particularly from those which are occasioned by the small pox. 5. They may proceed from the scars after a puncture in the cornea from a sword, knife, or fork. Or, 6. from a burn, or the corroding acrimony of caustic substances falling into the eye, tho'

they may sometimes be formed of a peculiar tunic growing to the eye itself.

These disorders of the cornea are some more and some less difficult to remove, according to their duration, and the particular causes from whence they proceed, with the patient's age and other circumstances. Infants may be more easily freed from them than adults, when they are not of any long standing ; but for those which are scars formed from wounds, burns, punctures, or the like, there is little or no hope of removing them. Heister directs, that these spots which arise from inspissated humours, and are not of long standing, be removed by a proper regimen, attenuating diet and medicines, especially a plentiful use of the decoctions and infusions which are sudorific ; but then, at the same time, there must be used externally phlebotomy, scarification, blisters, and frequent washing of the feet, and upon the eye itself may be applied discutient bags. In those spots which proceed from abscesses, or a suppuration of matter after an inflammation betwixt the laminæ of the cornea, which they elevate like a pea, an incision ought to be made into the cornea, to discharge the included matter ; the incision for this purpose must be made with a lancet, or couching needle, treating the eye afterwards with discutient medicines : but when the cornea is eroded, the following method is taken by Mr. St Yves ; first he removes the inflammation, and then orders the patient to wash his eye frequently with the aqua viridis ophthalmica Hartmanni, which is made weaker or stronger, according as the patient can bear it. In pustules arising from the small pox, there should be an apertion made by a needle or lancet, immediately to discharge the eroding matter, removing the pellicle afterwards with some burnt alum, candy-sugar, and the shells of eggs, made into powder, and applied every day to the cornea.

LEUCOPHLEGMATIA, in medicine, a kind of dropsy, otherwise called anasarca. See **ANASARCA** and **DROPSY**.

LEUE, a town of the austrian Netherlands, sixteen miles east of Louvain.

LEVEL, an instrument wherewith to draw a line parallel to the horizon, by means of which the true level, or the difference of ascent or descent between several places, may be found for conveying water, draining fens, &c.

There are several instruments of different contrivance and matter, invented for the perfection

perfection of levelling, all of which, for the practice, may be reduced to those that follow.

Air-LEVEL, that which shews the line of level by means of a bubble or air inclosed with some liquor in a glass-tube of an indeterminate length and thickness, whose two ends are hermetically sealed. When the bubble fixes itself at a certain mark, made exactly in the middle of the tube, the plane or ruler wherein it is fixed is level. When it is not level, the bubble will rise to one end. This glass-tube may be set in another of brass, having an aperture in the middle, whence the bubble of air may be observed. The liquor wherewith the tube is filled, is oil of tartar, or aqua secunda; those not being liable to freeze as common water, nor to rarefaction and condensation, as spirit of wine is. There is one of these instruments with sights, being an improvement upon that last described, which, by the addition of more apparatus, becomes more commodious and exact. It consists of an air-level, see plate CLVI. n^o 1. about eight inches long, and seven or eight lines in diameter, set in a brass-tube, 2. with an aperture in the middle, C. The tubes are carried in a strong straight ruler, a foot long, at whose ends are fixed two sights, 3, 3, exactly perpendicular to the tubes, and of an equal height, having a square hole, formed by two fillets of brass crossing each other at right angles, in the middle whereof is drilled a very little hole, through which a point on a level with the instrument is descried. The brass-tube is fastened on the ruler by means of two screws, one whereof, marked 4, serves to raise or depress the tube at pleasure, for bringing it towards a level. The top of the ball and socket is rivetted to a little ruler that springs, one end whereof is fastened with screws to the great ruler, and at the other end has a screw, 5, serving to raise and depress the instrument when nearly level.

This instrument, however, is yet less commodious than the following one, because though the holes be ever so small, yet they will still take in too great a space to determine the point of level precisely.

This instrument consists of an air level, with telescope-sights: this level (*ibid.* n^o 2.) is like the last, with this difference, that instead of plane sights, it carries a telescope to determine exactly a point of level at a good distance. The telescope is a little brass-tube, about fifteen inches long

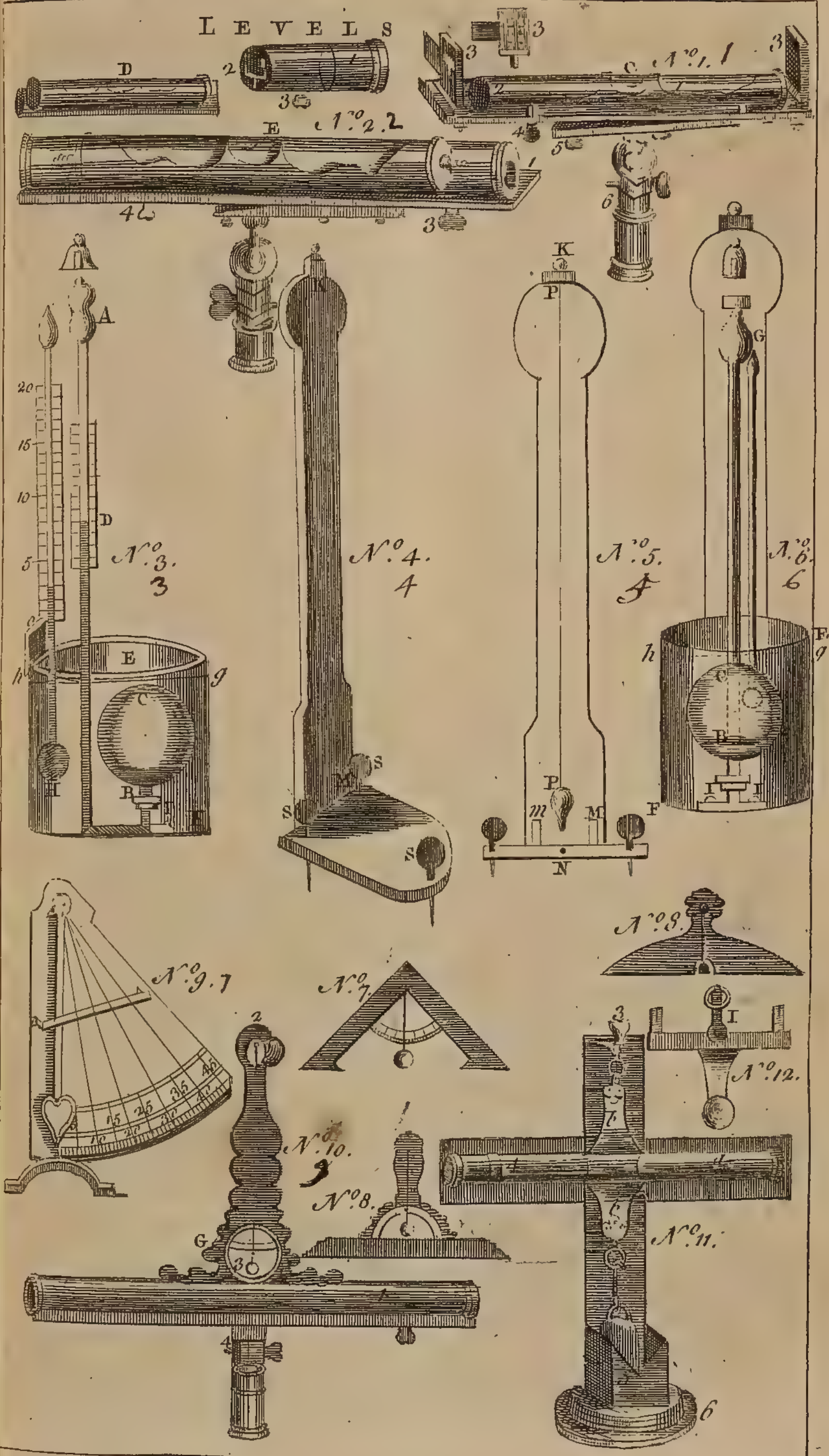
fastened on the same ruler as the level. At the end of the tube of the telescope, marked 1, enters the little tube, 1, carrying the eye-glass and an hair horizontally placed in the focus of the object-glass, 2. which little tube may be drawn out, or pushed in to the great one, for adjusting the telescope to different sights: at the other end of the telescope is placed the object-glass. The screw 3, is for raising or lowering the little fork, for carrying the hair, and making it agree with the bubble of air, when the instrument is level; and the screw 4, is for making the bubble of air, D or E, agree with the telescope: the whole is fitted to a ball and socket. M. Huygens is said to be the first inventor of this level, which has this advantage, that it may be inverted by turning the ruler and telescope half round; and if then the hair cut the same point that it did before, the operation is just.

It may be observed, that one may add a telescope to any kind of level, by applying it upon or parallel to the base or ruler, when there is occasion to take the level of remote objects.

Dr. Desaguliers contrived an instrument, by which the difference of level of two places, which could not be taken in less than four or five days with the best telescope-levels, may be taken in as few hours. The instrument is as follows: to the ball C (*ibid.* n^o 3.) is joined a recurve tube B A, with a very fine bore, and a small bubble at top, A, whose upper part is open. It is evident from the make of this instrument, that if it be inclined in carrying, no prejudice will be done to the liquor, which will always be right both in the ball and tube, when the instrument is set upright. If the air at C, be so expanded with heat, as to drive the liquor to the top of the tube, the cavity A, will receive the liquor, which will come down again and settle at D, or near it, according to the level of the place where the instrument is, as soon as the air at C, returns to the same temperament as to heat and cold. To preserve the same degree of heat, when the different observations are made, the machine is fixed in a tin vessel E F, filled with water up to g h, above the ball, and a very sensible thermometer has also its ball under water, that one may observe the liquor at D, in each experiment, when the thermometer stands at the same height as before. The water is poured out when the instrument is carried,

which

LEVELS



which one may do conveniently by means of the wooden frame, which is set upright by the three screws S, S, S, *ibid.* n° 4. and a line and plummet P P, n° 5. At the back part of the wooden frame, from the piece at top K, hangs the plummet P, over a brass point at N; M m are brackets, to make the upright board K N, continue at right angles with the horizontal one at N. N° 6, represents a front-view of the machine, supposing the fore-part of the tin-vessel transparent; and here the brass-socket of the recurve-tube, into which the ball is screwed, has two wings at I I, fixed to the bottom that the ball may not break the tube by its endeavour to emerge, when the water is poured in as high as g b.

After the Dr. had contrived this machine, he considered that, as the tube is of a very small bore, if the liquor should rise into the ball at A, n° 3. in carrying the instrument from one place to another, some of it would adhere to the sides of the ball A, and upon its descent in making the experiment, so much might be left behind, that the liquor would not be high enough at D, to shew the difference of the level; therefore, to prevent that inconveniency, he contrived a blank screw, to shut up the hole at A, as soon as one experiment is made, that in carrying the machine, the air in A, may ballance that in C, so that the liquor shall not run up and down the tube, whatever degree of heat and cold may act upon the instrument, in going from one place to another. Now because one experiment may be made in the morning, the water may be so cold, that when a second experiment is made at noon, the water cannot be brought to the same degree of cold it had in the morning; therefore, in making the first experiment, warm water must be mixed with the cold, and when the water has stood some time before it comes to be as cold as it is likely to be at the warmest part of that day, observe and set down the degree of the thermometer at which the spirit stands, and likewise the degree of the water in the barometer at D; then screw on the cap at A, pour out the water, and carry the instrument to the place whose level you would know; then pour in your water, and when the thermometer is come to the same degree as before, open the screw at top, and observe the liquor in the barometer.

The doctor's scale for the barometer is ten

inches long, and divided into tenths; so that such an instrument will serve for any heights not exceeding ten feet, each tenth of an inch answering to a foot in height.

The Dr. made no allowance for the decrease of density in the air, because he did not propose this machine for measuring mountains (though with a proper allowance for the decreasing density of the air, it will do very well) but for heights that want to be known in gardens, plantations, and the conveyance of water; where an experiment that answers two or three feet in a distance of twenty miles, will render this a very useful instrument.

Foot-LEVEL. See the article FOOT-LEVEL.

Artillery-Foot-LEVEL is in form of a square, having its two legs or branches of an equal length, at a juncture whereof is a little hole, whence hangs a thread and plummet, playing on a perpendicular line in the middle of a quadrant. It is divided into twice 45 degrees from the middle *ibid.* n° 7.

This instrument may be used on other occasions, by placing the ends of its two branches on a plane; for when the thread plays perpendicularly over the middle division of the quadrant, that plane is assuredly level. To use it in gunnery place the two ends on the piece of artillery, which you may raise to any proposed height, by means of the plummet, whose thread will give the degree above the level.

Carpenter's and Paviment's LEVEL, consists of a long ruler in the middle whereof is fitted, at right angles, another somewhat bigger, at the top of which is fastened a line, which, when it hangs over a fiducial line at right angles with the base, shews that the said base is horizontal. Sometimes this level is all of one board. *Ibid.* n° 8.

Gunner's LEVEL, for levelling cannons and mortars, consists of a triangular brass-plate, about four inches high, *ibid.* 9. at the bottom of which is a portion of a circle, divided into 45 degrees, which number is sufficient for the highest elevation of cannons and mortars, and for giving shot the greatest range; on the center of this segment of a circle is screwed a piece of brass, by means of which it may be fixed or screwed at pleasure; the end of this piece of brass is made so as to serve for a plummet and index, in order to shew the different degrees of elevation of pieces of artillery. This instrument has

has also a brass-foot, to set upon cannons or mortars, so as when those pieces are horizontal, the instrument will be perpendicular. The foot of this instrument is to be placed on the piece to be elevated, in such a manner, as that the point of the plummet may fall on the proper degree: this is what they call levelling the piece.

Mason's LEVEL, is composed of three rules, so joined as to form an isocles-rectangle, somewhat like a roman A, at the vertex whereof is fastened a thread, from which hangs a plummet, that passes over a fiducial line, marked in the middle of the base, when the thing, to which the level is applied, is horizontal; but declines from the mark, when the thing is lower on one side than on the other.

Plumb, or Pendulum LEVEL, that which shews the horizontal lines by means of another line perpendicular to that described by a plummet or pendulum. This instrument, *ibid.* n° 10. consists of two legs or branches, joined together at right angles, whereof that which carries the thread and plummet is about a foot and a half long; the thread is hung towards the top of the branch, at the point 2. the middle of the branch where the thread passes is hollow, so that it may hang free every where: but towards the bottom where there is a little blade of silver, whereon is drawn a line perpendicular to the telescope, the said cavity is covered by two pieces of brass, making as it were a kind of case, lest the wind should agitate the thread, for which reason the silver blade is covered with a glass G, to the end that it may be seen when the thread and plummet play upon the perpendicular: the telescope is fastened to the other branch of the instrument, and is about two feet long; having an hair placed horizontally across the focus of the object-glass, which determines the point of the level. The telescope must be fitted at right angles to the perpendicular. It has a ball and socket, by which it is fastened to the foot, and was invented by M. Picard.

Reflecting LEVEL, that made by means of a pretty long surface of water representing the same object inverted which we see erected by the eye, so that the point where these two objects appear to meet, is a level with the place where the surface of the water is found. This is the invention of M. Mariotte.

There is another reflecting level consisting of a mirror of steel, or the like, well

polished, and placed a little before the object-glass of a telescope, suspended perpendicularly. This mirror must make an angle of 45° with the telescope, in which case the perpendicular line of the said telescope is converted into a horizontal line, which is the same with the line of level. This is the invention of M. Cassini.

Water-LEVEL, that which shews the horizontal line by means of a surface of water or other liquor, founded on this principle, that water always places itself level. See the article FLUID.

The most simple is made of a long wooden trough, or canal, whose sides are parallel to the base, so that being equally filled with water, its surface shews the line of level. This is the chorobates of the antients. See CHOROBATA.

It is also made with two cups fitted to the two ends of a pipe, three or four feet long, about an inch in diameter, by means whereof the water communicates from the one to the other cup; and this pipe being moveable on its stand by means of a ball and socket, when the two cups become equally full of water, their two surfaces mark the line of level.

This instrument, instead of cups, may also be made with two short cylinders of glass three or four inches long, fastened to each extreme of the pipe with wax or mastic. Into the pipe is poured some common or coloured water, which shews itself through the cylinders, by means whereof the line of level is determined; the height of the water, with respect to the center of the earth, being always the same in both cylinders: this level, tho' very simple, is yet very commodious for levelling small distances.

LEVEL of Mr. Huygens's invention, consists of a telescope *a*, *ibid.* n° 11. in form of a cylinder going through a ferril in which it is fastened by the middle. This ferril has two flat branches *b b*, one above, and the other below, at the ends whereof are fastened little moving pieces which carry two rings, by one of which the telescope is suspended to an hook at the end of the screw 3, and by the other a pretty heavy weight is suspended, in order to keep the telescope in equilibrio. This weight hangs in the box 5, which is almost filled with linseed oil, oil of walnuts, or other matter that will not easily coagulate, for more aptly settling the ballance of the weight and telescope. The instrument carries two telescopes close and very parallel to each other; the eye-glass of the one

one being against the object-glass of the other, that one may see each way without turning the level. In the focus of the object-glass of each telescope must a little hair be strained horizontally, to be raised and lowered as occasion requires by a little screw. If the tube of the telescope be not found level when suspended, a ferril or ring, 4, is put on it, and is to be slid along till it fixes to a level. The hook on which the instrument is hung, is fixed to a flat wooden cross; at the ends of each arm whereof there is a hook serving to keep the telescope from too much agitation in using or carriage. To the said flat cross is applied another hollow one, that serves as a case for the instrument; but the two ends are left open, that the telescope may be secured from the weather, and always in a condition to be used. The foot of this instrument is a round brass plate, to which are fastened three brass-ferrils, moveable by means of joints wherein are put staves, and on this foot is placed the box.

N^o 12. marked I, is a ballance level; which being suspended by the ring, the two sights when in equilibrio, will be horizontal, or in a level.

LEVELLING, the art of finding a line parallel to the horizon at one or more stations, in order to determine the height of one place with regard to another. See the preceding article.

A truly level surface is a segment of a spherical surface, which is concentric to the globe of the earth. A true line of level is an arch of a great circle, which is imagined to be described upon a truly level surface. The apparent level is a straight line drawn tangent to an arch or line of true level. Every point of the apparent level, except the point of contact, is higher than the true level: thus let E A G (plate CLVII. fig. 1. n^o 1.) be an arch of a great circle drawn upon the earth; to a person who stands upon the earth at A, the line H D is the apparent level parallel to his rational horizon R R; but this line, the farther it is extended from his station A, the farther it recedes from the center; for B C is longer than A C, and D C is longer than B C, &c. The common methods of levelling are sufficient for laying pavements of walks, for conveying water to small distances, for placing horizontal dials, or astronomical instruments; but in levelling the bottoms of canals which are to convey

water to the distance of many miles, the difference between the apparent and true level must be taken into the account: thus let I A L (*ibid.* n^o 2.) be an arch of a great circle upon the earth: let it be required to cut a canal whose bottom shall be a true level from A to B, of the length of 5078 feet: the common method is to place the levelling instrument in the bottom of the canal at A, and looking through the sights placed horizontally at a stick set up perpendicular at B, to make a mark where the visual ray or point of the apparent level points at E, and then to sink the bottom of the canal at B as much below E as A is below D. But this will not give the true level: for according to Cassini's calculation, at the distance of 5078 feet the apparent level is seven inches above the true; and therefore to make a true level, B must be sunk seven inches lower than the apparent level directs; so that if A be four feet below D, B must be four feet seven inches below the mark E. We have here mentioned the error which will arise from placing the level at one end of the line to be levelled, and shewn how to correct it; but in most cases it is better to take a station in the middle of the line to be levelled: thus if the points H and B are to be levelled, place the instrument in the middle at A, and setting up sticks perpendicular at H and B, make marks upon each stick where the apparent level points, as E and F; those points are level: and if you sink H as much below F, as B is below E, H A B will be a true level.

The operation of levelling is as follows: suppose the height of the point A, (*ibid.* n^o 3.) on the top of a mountain above that of the point B, and at the foot thereof, be required. Place the level about the middle distance between the two points as in D, and staffs in A and B; and let there be persons instructed with signals for raising and lowering, on the said staffs, little marks of pasteboard or other matter, the level being placed horizontally by the bubble, &c. Look towards the staff A E, and cause the mark so raised to be lowered till the middle, upper edge, or other most conspicuous part, appear in the visual ray. Then measuring exactly the perpendicular height of the point E above the point A, which suppose six feet four inches; set that down in your book: then turn the level horizontally about, that the eye-

glass of the telescope may be still next the eye when you look the other way; if you have only plain sights, the instrument need not be turned; and cause the person at the staff B, to raise or lower his mark till some conspicuous part of it fall in the visual ray, as at C: then measure the perpendicular height of C above B, which suppose sixteen feet six inches: set this also down in the book above the other number of the first observation; subtract the one from the other, the remainder will be ten feet two inches, which is the difference of the level between A and B, or the height of the point A above the point B.

If the point D, where the instrument is fixed, be in the middle between the two points A and B, there will be no necessity for reducing the apparent level to the true level; the visual ray in that case being raised equally above the true level. If it be further required to know whether there be a sufficient descent for conveying water from the spring A (*ibid.* n° 4.) to the point B. Here in regard the distance from A to B is considerable, it is required that several operations be made. Having then chosen a proper place for the first station, as at I, set up a staff in the point A, near the spring, with a proper mark to slide up and down the staff, as L, and measure the distance from A to I, which suppose two thousand yards. Then the level being adjusted in the point I, let the mark L be raised and lowered till such time as you spy some conspicuous part of it through the telescope or sights of the level, and measure the height A L, which suppose thirteen feet five inches. But in regard the distance A I is two thousand yards; you must have recourse to your table for a reduction, subtracting eleven inches, which will leave the height of A L twelve feet six inches, and this note down in your book. Now turn the level horizontally about, so that the eye-glass of the telescope may be towards A, and fixing up another staff at H, cause the mark G to be moved up and down till you spy some conspicuous part through the telescope or sights. Measure the height H G, which suppose seven yards one foot two inches. Measure likewise the distance of the points I H, which suppose one thousand three hundred yards, for which distance four inches eight lines must be subtracted from the height H G, which consequently will only leave seven

yards nine inches four lines, to be taken down in your book. This done, remove the level forwards to some other eminence as E, whence the staff H may be viewed; as also another staff at D, near the place whither the water is to be conveyed. The level being again adjusted in the point E, look back to the staff H, and managing the mark as before, the visual ray will give the point F. Measure the height H F, which suppose eleven feet six inches. Measure likewise the distance H E, which suppose a thousand yards, for which there is two inches nine lines of abatement, which being taken from the height H F, there will remain eleven feet three inches three lines, which enter in your book. Lastly, turning the level to look at the next staff D, the visual ray will give the point D. Measure the height of D from the ground, which suppose eight feet three inches. Measure also the distance from the station E to B, which suppose nine hundred yards, for which distance there are two inches three lines of abatement, which being taken from the height B D, there will remain eight feet nine lines, which enter as before.

For the manner of entering down observations in your book, observe that when a proper place or station for the level between the two points has been pitched upon, write down the two heights observed at that station in two different columns, *viz.* under the first column, those observed in looking through the telescope when the eye was from the spring, or towards the point, which we may call back-sights; and under the second column, those observed when the eye was next the spring, which we call foresights. Having summed up the heights of each column separately, subtract the lesser from the greater, the remainder will be the difference of the level between the points A and B. If the distance of the two points be required, add all the distances measured together; and dividing the difference of height by the yards of the distances, for each two hundred yards you will have a descent of about two inches nine lines.

Dr. Halley suggests a new method of levelling, performed wholly by means of the barometer, in which the mercury is found to be suspended to so much the less height, as the place is farther remote from the center of the earth; whence the different heights of the mercury in two places,

places gives the difference of level. This method has been put in practice by some of the french academy.

LEVELLING-STAVES, instruments used in levelling, serving to carry the marks to be observed, and at the same time to measure the heights of those marks from the ground. They usually consist each of two long wooden rulers, made to slide over one another, and divide into feet, inches, &c. LEVER, or LEAVER, in mechanics, an inflexible right line, rod, or beam, supported in a single point on a fulcrum or prop, and used for the raising of weights; being either void of weight itself, or at least having such a weight as may be commodiously counter-ballanced.

The lever is the second, or, as others will have it, the first of those called mechanical powers, or simple machines, as being of all others the most simple; and is chiefly applied, for raising weights to small heights.

In a lever there are three things to be considered, the weight to be raised or sustained, as O, (plate CLVII. fig. 2. n^o 1.) The power by which it is to be raised or sustained, as B. And the fulcrum or prop D, whereon the lever is sustained, or rather on which it moves round, the fulcrum remaining fixed.

Levers are of three kinds; the first is that wherein the prop or fixed point D, (n^o 1.) is between the weight suspended at the end O, and the power applied at the other end B: it is plain that scissars, pincers, snuffers, &c. are levers of this kind. The lever of the second kind, is that wherein the fulcrum C, (n^o 2.) is at one end; and the power applied at the other end B, the weight D being suspended at the point A between the ends; that is, between the power and the fixed point: it is plain that the oars and rudder of a boat are such levers; as also cutting knives as are fixed at one end, as those used by druggists for cutting aromatic wood and roots; by bakers for cutting their bread; and likewise doors, whose hinges are as the fixed point.

The lever of the third kind, is that whose fixed point C, (n^o 3.) is at one end, and the weight D suspended at the other end A, the power being applied at the point B between the ends; that is, between the weight and the fulcrum: it is plain that a ladder which is lifted by the middle, in order to rear it against a wall, is a lever of this kind.

There is yet a fourth kind of lever, called

the bended lever, so called from its being bent at the fixed point C, (n^o 4.) : it appears plainly that such a lever is of the first kind, because the weight D hangs at its end A, and the power is applied at its other end B, where it draws by the line of direction B E: a hammer to draw out a nail, is a bended-lever.

We shall here demonstrate the law of the equilibrium in the lever, which is the foundation of all the other propositions of this kind in mechanics.

Theorem I. Let A B (n^o 5.) be a lever only moveable round the fulcrum C, the space described by each of its points will be as its distance from the fulcrum.

For let the lever be moved out of the situation A C B, into the situation a C b, the point A will describe the periphery A a, but B will pass over the periphery B b. Now by reason of the similar sectors A C a, B C b, A a is to B b, as A C to B C; that is, the spaces described by the points A and B, are as their distances from the fulcrum. If to the points A and B be applied powers drawing the brachia of the lever perpendicularly, the spaces that are described by them according to or contrary to their propensions, are not the peripheries A a, B b, but the perpendiculars a F, b E, let fall on the brachia of the lever. For the power in A is moved, according to its proper direction or propension, through the space a F only, and no farther: as, for the same cause, the way passed thro' by the power B, according to its proper direction, is to be estimated by b E. But by reason of the equiangular triangles a C F, b C E, a F is to b E as a C or A C to b C or B C; that is, the spaces run over by powers according to their proper directions, will be as their distances from the fulcrum.

But if the direction of the power is not a right line, perpendicular to the brachium of the lever A C, (n^o 6.) let, from the fulcrum to the line of direction, be drawn the perpendicular C G, and the space described by the power according to its propension, will be proportionable to that perpendicular: for it matters not whether the thread F G A, by which the power acts, is affixed to the point G or A, or indeed to the point D; for the line of direction remaining the same, its force to move round the plane A D C B, will be the same, as if the thread was fixed to the point G, and the way described by it in a given time, according to its proper

proper direction, will be proportionable to the right line CG . Wherefore it is manifest in every case, that the way described by any force according to its proper direction, is proportionable to the distance of the line of direction from the fulcrum.

Theorem II. In a lever, the moving force or power that has to the weight the same ratio, which the distance of the line of direction of the weight from the fulcrum, has to the distance of the direction of the power from the fulcrum, will sustain the weight; and therefore if it be ever so little increased, it will raise the weight. It is manifest from the preceding theorem, that the spaces which are described by a power and weight according or contrary to their proper propensions, are proportionable to the distances of the lines of direction from the fulcrum; but the velocities are proportionable to these spaces, and consequently will be also proportionable to the distances. If therefore the power P is to the weight Q , (*n° 7.*) as CQ , the distance of the direction of the weight from the fulcrum to CA , the distance of the direction of the power from the fulcrum, the power will be to the weight, as the velocity of the weight to the velocity of the power; the momentum therefore of the power, will be equal to the momentum of the weight: and consequently the power will be equivalent to the weight; which if it be ever so little increased, it will raise the weight. $Q. E. D.$

Hence appears the reason, why by the *statera romana*, or steelyard, as it is commonly called, the weights of different bodies are examined all by one and the same weight only. For this instrument is a lever of unequal brachia, one whereof, CQ , is extended in length from the axis of motion C , and which ought to be the axis of equilibrium, suppose one inch, or less; the other brachium, AC , may be of any greater length that is capable of being exactly divided into parts, each equal to CQ , and numbered by figures, 1, 2, 3, 4, &c. Then if the body whose weight we want to discover is hung on at Q , the given or known weight P is moveable on the contrary brachium; and by removing it from or bringing it nearer the center C , is discovered the distance where is an exact equilibrium. See the article **BALLANCE**.

Thus, there is a great affinity betwixt the lever and common ballance, only

the center is not in the middle, but near one end; for which reason it is used to elevate or raise a great weight.

If we examine the instruments in common use, we shall find many of them reducible to levers of one kind or other, as hinted above. Thus a pair of pincers is made up of two levers of the first kind, whose common center of motion is at the rivet C , (*ibid.* fig. 3. *n° 1.*) the power being applied at the handles Bb to press them together, and thereby pinch the body D between the opposite extremities Aa ; in which case the power acts with so much the greater force, as the handles CB , Cb , are longer than the distance CA , ca . So a pair of common scissars, (*ibid.* *n° 2.*) acts upon the same principles. The force of a lever in this way, is remarkable in the brasier's and tinman's sheers, whereby one man pressing upon the handle B , (*ibid.* *n° 3.*) and raising the lower side AC , moveable about the center C , is able to cut a plate of brass or copper D , a quarter of an inch thick; the other shorter lever ACE being riveted to a couple of strong standards fixed in the block F . The little cart, BCA , (*ibid.* *n° 4.*) likewise belongs to the levers of the first kind; whereby a single man at B , is able to lift a heavy stone D , upon the axle-tree of the wheels EF as a fulcrum; and being raised, by means of the same wheels, can convey it to the place required.

The cutting knife, CDB , (*ibid.* *n° 5.*) used by many artificers, is a lever of the second kind; as being moveable on the joint or center of motion C , whereby it is fastened to the plank CE ; and the power applied at B to cut the weight D , placed between it and the center of motion. A pair of bellows are two levers of the second kind, whose common center of motion is at the end of the boards where the nose begins; the power being applied at the handles, whilst the air to be pressed out is the weight. The oars of a boat or galley, as well as the rudder, are likewise levers of the second kind; for the water at C , (*ibid.* *n° 6.* and *7.*) makes a resistance as a fulcrum; whilst the man or power acts at B to push forward the vessel by that part of the oar or rudder D , which rest upon it. The masts of ships are also to be reckoned among the levers of the second kind; the fulcrum being at the bottom of the ship B , (*ibid.* *n° 7.*) and the moving force the wind gathered in the sail, which by

the

the help of the sail-yard D A E is applied at A, the upper end of the mast; whilst the weight or body to be moved, viz. the vessel C, is placed between the power and fulcrum: hence appears the reason why a ship sails swiftest when the yard is raised high, because of its greater distance from the fulcrum.

The sheep-sheers, W P C, (*ibid.* n^o 8.) are two levers of the third kind; the common center of motion being at the springing bow at C, whilst the power or hand is applied at P p, and the wool to be cut is the weight at W. A pair of tongs are likewise levers of the third kind. But the use of levers of the third kind is most beautifully shewn in the animal body; where the all-wise Creator has given animals a power of moving their limbs with great velocity, by applying the power of the muscles very near the center of motion; for the theory of which, see the articles MUSCLE and OSTEOLOGY.

LEVERET, among sportsmen, denotes a hare in the first year of her age.

LEVIGATION, in pharmacy and chemistry, the reducing hard and ponderous bodies to an impalpable powder, by grinding them on a porphyry, or the like. See the article PORPHYRY.

It is generally necessary in levigation, to add some fluid to the matter, which purpose is answered equally well by common water, as by rose or other simple distilled water; since, in drying the powders, these last totally exhale without having imparted any virtue to the preparation.

LEVITE, in a general sense, means all the descendants of Levi, among whom were the jewish priests themselves; who being descended from Aaron, were likewise of the race of Levi: but it is more particularly used for an order of officers in that church, who were employed in performing the manual service of the temple, such as in fetching wood, water, and other things necessary for the sacrifices; and in singing and playing upon instruments of music.

The consecration of the levites was to be performed with the following ceremonies: they were to be sprinkled with the water of expiation, to shave all their flesh, and wash their cloaths: they were then to bring two bullocks before the door of the tabernacle, where the whole congregation laid their hands upon the levites heads: the bullocks were then sacrificed, one for a burnt offering, and the other

for a sin offering; and, lastly, they were to be presented to the high-priest, who was to consecrate them to the Lord.

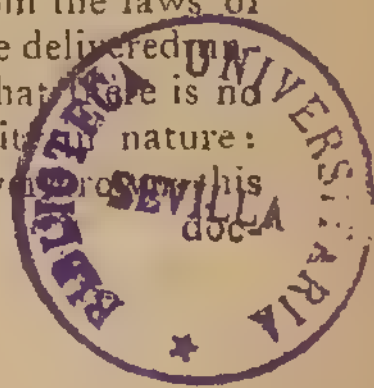
The levites were subsisted by the tythe of all the corn, fruit and cattle, throughout Israel; a tythe of which tythe they were to give to the priests: they had also forty-eight cities for their habitation; and while they were actually employed in the service of the temple, they were subsisted out of the daily sacrifices.

LEVITICUS, a canonical book of the Old Testament, so called from its containing the laws and regulations relating to the priests, levites, and sacrifices.

The seven first chapters of this book prescribe the ceremonies to be observed in offering burnt-sacrifices, meat-offerings, peace-offerings, &c. then Moses relates in what manner the priests were to be consecrated, and the misfortune of Nadab and Abihu, who offered incense to the Lord with strange fire. Upon this occasion, he prescribes some laws concerning the mourning of the priests, and forbids their drinking wine, while they were employed in the service of the tabernacle. In the eleventh, twelfth, thirteenth, and fourteenth chapters, he lays down rules for distinguishing clean and unclean beasts, and concerning the leprosy, purifications, &c. appoints the ceremonies to be observed upon the great day of expiation: regulates the degrees of kindred within which persons were allowed or forbidden to marry: prohibits alliances with the Canaanites, and also idolatry, theft, perjury, calumny, &c. In the twenty third chapter, he takes notice of the principal annual festivals, the passover, pentecost, &c. prescribes what was to be observed in the sabbatical and jubilee-years, and concludes with regulations concerning vows and tythes.

LEVITY, in physiology, the privation or want of weight in any body, when compared with another that is heavier than it, in which sense it stands opposed to gravity. See the articles GRAVITATION and GRAVITY.

The schools maintain, that there is such a thing as positive and absolute levity, and impute to this the rise or emergency of bodies lighter in specie than the bodies wherein they rise; but from the laws of gravitation, which we have delivered under that article, we learn that there is no such thing as absolute levity in nature: besides, Mr. Boyle has overthrown this



doctrine of positive and absolute levity by repeated experiments, as may be seen at large in the second volume of Shaw's Boyle, page 362—365.

LEVERPOOL. See **LIVERPOOL.**

LEUROUX, a town of France, in the province of Orleanois, thirty-five miles south-west of Bourges.

LEUTKIRK, a town of Germany, in the circle of Swabia, thirty-five miles south of Ulm.

LEUTMERTIS, a city of Bohemia, 25 miles north of Prague.

LEVY, in law, signifies to gather or collect, as to levy money; and to levy a fine of lands, is the passing a fine.

LEWARDEN, a city of the United Provinces, the capital of west Friesland: east long. $5^{\circ} 35'$, north lat. $53^{\circ} 20'$.

LEWES, a borough-town of Sussex, forty miles south of London, which sends two members to parliament.

LEWIS, the most northerly of any of the western islands of Scotland, lying in 8° odd minutes west long. and between 58° and 59° odd minutes north lat.

LEWIS. See the article **FORT-LEWIS.**

LEWIS-PORT. See **PORT-LOUIS.**

LEWISBOURG, the capital of Cape Breton, in North America: west long. $61^{\circ} 30'$, north lat. $46^{\circ} 50'$.

LEXICON, the same as dictionary, but chiefly used in speaking of greek dictionaries. See **DICTIONARY.**

LEYDEN, a city of Holland, in which there is a famous university, situated twenty miles south of Amsterdam.

LEYNA, a river of Germany, which rises in the confines of Hesse, and discharges itself into the river Aller, at Batmar.

LEYS, in country-affairs, denote pasture-grounds, or arable lands turned into pasture. See the article **PASTURE.**

LEYTE, one of the Philippine islands, separated from the island Philippina by a narrow channel: east long. 123° , north lat. 11° .

LEZINA, a town of the kingdom of Naples, situated on a bay of the gulph of Venice, seventy-five miles north-east of Naples.

LHON, a river which rises in the landgrate of Hesse-Cassel, and falls into the Rhine almost opposite to Coblentz.

LIBANUS, a range of mountains in asiatic Turkey, between Syria and Palestine, which extend from Sidon on the Levant, eastward beyond Damascus.

LIBATION, a religious ceremony among the antient pagans, which consisted in an

effusion of liquors poured on the head of the victims prepared for sacrifice.

Libations were also in use among the Hebrews, who poured a hin of wine on the victim after it was killed, and the several pieces of the sacrifice were laid on the altar, ready to be consumed in the flames.

The mingrelian christians use a sort of libation at their meals. Before they sit down to table, they take up the first glass of wine that is poured out, and after calling upon the name of the Lord, and paying their respects to the company, sprinkle part of it upon the floor. We meet with the same custom among the antient Romans.

LIBAW, a port-town of Poland, in the dutchy of Courland, situated on a bay of the Baltic: east longitude 21° , north latitude $56^{\circ} 40'$.

LIBEL, injurious reproaches or accusations against a person, written and published in order to expose him to public contempt, hatred or ridicule. The lawyers say, a libel may also be without writing, as where a person is painted with asses-ears, a fool's coat, &c. or where a gallows, or any other ignominious sign, is fixed at his door.

Libels are criminal, because where they are made against a private man, they may be the means of exciting him or his friends to seek revenge, and consequently to break the peace: on this account it is no justification of a libel that its contents are true, or that the person libelled has a bad character; for a libel is the more provoking, in proportion as it has the greater appearance of truth: it is therefore held, that in a prosecution on an indictment or information, it is not material whether the matter of a libel be true or false; but in an action upon the case, a defendant may justify that the matter is true. The sending a scandalous letter to the party himself, without shewing or publishing it to others, is no libel; though if it be sent to a third person, or otherwise dispersed, it is a publication of the libel. In the making of libels, if one dictates, another writes, and a third approves of what is written, they are all deemed makers or composers of the libel. The composer, procurer, and publisher of a libel are liable to a fine, imprisonment, the pillory, or the like corporal punishment, at the discretion of the court where the trial is held, and according to the heinousness of the offence.

LIBEL,

LIBEL, in the law of Scotland, signifies an indictment. See **INDICTMENT**.

LIBELLA, or **LIBELLULA**, in the history of insects, a genus of four-winged flies, called in english dragon-flies, or adder-flies; the characters of which are, that they are furnished with jaws, the antennæ are short, and the tail terminated by a kind of forceps.

LIBER, among botanists, denotes the rind or inner bark of trees. See the article **BARK**.

LIBERALIA, in roman antiquity, the same with the dionysia of the Greeks. See the article **DIONYSIA**.

LIBERATE, in law, a writ that lies for the payment of a pension, or annual sum, granted under the great seal; being directed to the treasurer and chamberlains of the exchequer.

It is also the name of two other writs, one directed to the sheriff of a county, commanding him to deliver possession of lands or goods extended upon the forfeiture of a recognizance; the other directed to a gaoler for delivery of a prisoner, that has put in bail for his appearance.

LIBERIA, in roman antiquity, a festival observed on the sixteenth of the calends of April, at which time the youth laid aside their juvenile habit for the toga virilis, or habit peculiar to grown men. See the article **TOGA**.

LIBERTATE PROBANDA, an antient writ for persons claimed as villains, to prove themselves free. See **VILLAIN**.

LIBERTATIBUS ALLOCANDIS, a writ which lies for a citizen or burghers, to have his privilege allowed.

LIBERTUS, in roman antiquity, a person who from being a slave had obtained his freedom. See **MANUMISSION**.

The difference between the *liberti* and *libertini* was this: the *liberti* were such as had been actually made free themselves, and the *libertini* were the children of such persons.

LIBERTY, *libertas*, in general, denotes a state of freedom, in contradistinction to slavery. See the article **FREEDOM**.

According to Cicero, liberty is the power of living as a man pleases, or without being controlled by another.

In a legal sense, liberty signifies some privilege that is held by charter or prescription.

LIBERTY of the tongue, in the manege, a void space left in the middle of a bit to give place to a horse's tongue. See the article **BIT**.

LIBOURN, a town of France, ten miles north-east of Bourdeaux.

LIBRA, the **BALANCE**, in astronomy, one of the twelve signs of the zodiac, the sixth in order; so called because when the sun enters it, the days and nights are equal, as if weighed in a balance.

Authors enumerate from ten to forty-nine stars in this sign.

LIBRA, in roman antiquity, a pound weight; also a coin, equal in value to twenty denarii.

LIBRARY, an edifice or apartment destined for holding a considerable number of books placed regularly on shelves; or, the books themselves lodged in it.

The first who erected a library at Athens was the tyrant Pisistratus, which was transported by Xerxes into Persia, and afterwards brought back by Seleucus Nicanor to Athens. Plutarch says, that under Eumenes there was a library at Pergamus that contained 200,000 books. That of Ptolemy Philadelphus, according to A. Gellius, contained 700,000, which were all burnt by Cæsar's soldiers. Constantine and his successors erected a magnificent one at Constantinople, which in the eighth century contained 300,000 volumes, and among the rest, one in which the Iliad and Odysee were written in letters of gold, on the guts of a serpent; but this library was burnt by order of Leo Isaurus. The most celebrated libraries of antient Rome, were the Ulpian and the Palatine, and in modern Rome, that of the Vatican; the foundation of the Vatican library was laid by pope Nicholas, in the year 1450; it was afterwards destroyed in the sacking of Rome, by the constable of Bourbon, and restored by pope Sixtus V. and has been considerably enriched with the ruins of that of Heidelberg, plundered by count Tilly in 1682. One of the most complete libraries in Europe, is that erected by Cosmo de Medicis; though it is now exceeded by that of the french king, which was begun by Francis I. augmented by cardinal Richelieu, and completed by M. Colbert. The emperor's library at Vienna, according to Lambecius, consists of 80,000 volumes, and 15,940 curious medals. The Bodleian library at Oxford, exceeds that of any university in Europe, and even those of any of the sovereigns of Europe, except the emperor's and the french king's, which are each of them older by a hundred years. It was first opened in 1602, and

and has since been increased by a great number of benefactors: indeed the Medicean library, that of Bessarion at Venice, and those just mentioned, exceed it in greek manuscripts, but it outdoes them all in oriental manuscripts; and as to printed books, the Ambrosian at Milan, and that of Wolfenbüttele, are two of the most famous, and yet both are inferior to the Bodleian. The Cotton-library consists wholly of manuscripts, particularly of such as relate to the history and antiquities of England; which, as they are, now bound, make about 1000 volumes.

In Edinburgh there is a good library belonging to the university, well furnished with books; which are kept in good order, and cloistered up with wire-doors, that none but the keeper can open; a method much more commodious than the multitude of chains used in other libraries. There is also a noble library of books and manuscripts, belonging to the gentlemen of the law.

LIBRATION, in astronomy, an apparent irregularity of the moon's motion, whereby she seems to librate about her axis, sometimes from the east to the west, and now and then from the west to the east; so that the parts in the western limb or margin of the moon sometimes recede from the center of the disk, and sometimes move towards it, by which means they become alternately visible and invisible to the inhabitants of the earth. See the article MOON.

LIBRATION of the earth, is sometimes used to denote the parallelism of the earth's axis, in every part of its orbit round the sun. See EARTH and PARALLELISM.

LIBYA, in ancient geography, a large extent of Africa, lying south-west of Egypt.

LICENCE, in law, an authority given to a person to do some lawful act.

A licence is a personal power, and therefore cannot be transferred to another. If the person licensed abuse the power given him, in that case he becomes a trespasser.

LICENCE TO ARISE, in law, is a space of time given by the court to a tenant who is effoined *de malo lecti*, in a real action, to get out of his bed.

LICENTiate, one who has obtained the degree of a licence.

The greatest number of the officers of justice in Spain, are distinguished by no other title but that of licentiate. In order to pass licentiate in common law,

civil law, and physic, they must have studied seven years; and in divinity, ten. Among us, a licentiate usually means a physician who has a licence to practise, granted by the college of physicians, or the bishop of the diocese. See the article COLLEGE of physicians.

LICHEN, LIVER-WORT, in botany, a genus of the cryptogamia class of plants, which have the most perfect fructification of all the mosses: the flowers are monopetalous, standing on a pedicle, and divided into segments at the limb, somewhat like stars, buttons, mushrooms, &c. See plate CLVIII. fig. 1.

The grey ground liver-wort, found plentifully with us in woods and heaths, is famous for its virtues against the bite of a mad dog: it is the basis of the pulvis antilyssus of the shops.

LICTORS, *lictors*, in roman antiquity, the serjeants or beadles who carried the fasces before the supreme magistrates: it was also a part of their office to be the public executioners in beheading, scourging, &c.

As to their number, a dictator had twenty-four, a consul twelve, the master of the horse six, a prætor six, and each vestal virgin had one, whenever they appeared abroad.

LIDD, a market-town of Kent, situated near the english channel, five miles south west of Romney.

LIDDESDALE, a county of Scotland, bounded by Tiviotdale, on the north; Cumberland, on the south-east; and Annandale, on the south-west.

LIEGE, in law, a term sometimes used for liege-lord, or one who owns no superior; and sometimes for liege-man, or one who owes allegiance to the liege-lord. In our statutes, the king's subjects are sometimes called lieges, or liege-people.

LIEGE, in geography, the capital of the bishopric of the same name in Germany, situated on the river Maes, twelve miles south of Maestricht; east long. $5^{\circ} 36'$, north lat. $50^{\circ} 40'$.

LIEGEANCE, in law. See the article ALLEGIANCE.

LIEN, the spleen, in anatomy. See the article SPLEEN.

LIENTERY, is a flux of the belly, in which, whatever is taken in is discharged by stool as it is swallowed, or very little altered either in colour or substance. A pain of the stomach, says Etmuller, is an inseparable attendant of a lientery, and

and it always torments the patient most after eating till he hath gone to stool. The urine is in a small quantity, and high coloured. A scorbutic lientery is a very dangerous distemper, hard to be cured, and very subject to relapses: it disposes the patient to a cachexy, or ill habit, and a tabes.

In the cure of this distemper, the stomach is, above all things, to be strengthened; rhubarb ought to be taken; preparations of coral and quinces are very much commended; and, in general, all those things used against vomiting are convenient here. The most simple stomachics, and most easily prepared, often do more good than the compounds: for example, preserved nutmegs, or ginger, the white of eggs boiled in vinegar, or wormwood-wine prepared with mastic.

LIERE, a town of the Austrian Netherlands, in the province of Brabant, twelve miles south-east of Antwerp.

LIERS, a village of the bishopric of Liege, in the circle of Westphalia, in Germany, situated four miles north of Liege.

LIEUTENANT, an officer who supplies the place, and discharges the office of a superior in his absence. Of these, some are civil, as the lords-lieutenants of kingdoms, and the lords-lieutenants of counties; and others are military, as the lieutenant-general, lieutenant-general of the artillery, lieutenant-colonel, lieutenant of the artillery of the tower, lieutenants of horse, foot, ships of war, &c.

Lord LIEUTENANT of Ireland, is properly a viceroy, and has all the state and grandeur of a king of England, except being served upon the knee. He has the power of making war and peace, of bestowing all the offices under the government, of dubbing knights, and of pardoning all crimes except high treason; he also calls and prorogues the parliament, but no bill can pass without the royal assent. He is assisted in his government by a privy-council; and, on his leaving the kingdom, he appoints the lords of the regency, who govern in his absence.

Lords LIEUTENANTS of counties, are officers, who, upon any invasion or rebellion, have power to raise the militia, and to give commissions to colonels and other officers, to arm and form them into regiments, troops and companies. Under the lords-lieutenants, are deputy-lieutenants, who have the same power; these are chosen by the lords-lieutenants, out of the principal gentlemen of each

county, and presented to the king for his approbation.

LIEUTENANT-GENERAL, is an officer next in rank to the general; in battle, he commands one of the wings; in a march, a detachment, or a flying camp; also a quarter, at a siege, or one of the attacks, when it is his day of duty.

LIFE, *vita*, is peculiarly used to denote the animated state of living creatures, or the time that the union of their soul and body lasts. See the articles ANIMAL, CIRCULATION, FUNCTION, &c.

Lord Bacon makes the prolongation of life one of the three branches into which he divides medicine. See the articles MEDICINE and LONGÆVITY.

Doctor Halley, Mr. De Moivre, and others, have taken laudable pains in estimating the probabilities of life from the bills of mortality; whence the value of annuities for life have been determined. See the articles MORTALITY and ANNUITY.

Mr. De Moivre observing that the probabilities of life decreased nearly in arithmetic progression, when considered from a term given, found the following easy rule for the value of any annuity on a life

$$1 - \frac{r}{n}P$$

of a given age, viz. $\frac{r}{n}$; where P

represents the value of an annuity certain of 1 l. for as many years as are intercepted between the age given, and the extremity of old age, supposed at 86, and that interval of life is expressed by n ; and r stands for the amount of the principal and interest of 1 l. in one year.

The rule therefore, in words at length, will be: Take the value of an annuity certain for so many years as are denoted by the complement of life; multiply this value by the rate of interest, and divide the product by the complement of life; then let the quotient be subtracted from 1, and let the remainder be divided by the interest of 1 l. then this last quotient will express the value of an annuity for an age given.

Thus, suppose it were required to find the present value of an annuity of 1 l. for an age at 50, interest being at 5 per cent. The complement of life being 36; let the value of an annuity certain, according to the given rate of interest, be taken from the tables of such annuities, and this value will be found to be 16.5468. Let this value be multiplied by the rate

11 N of

of interest 1.05; the product will be 17.3741. Let this product be divided by the complement of life, that is, in this case, by 36, the quotient will be 0.04826; subtract this quotient from unity, the remainder will be 0.5174. Lastly, divide this quotient by the interest of 1l. that is, in the present case, 0.05, and the new quotient will be 10.35, which will express the value of an annuity of 1l. to continue during a life of 50, or, in other words, how many years purchase a life of 50 is worth. On these principles, he has constructed tables of the value of annuities for lives, at different rates of interest; one of which we shall here insert, which shews the value of an annuity for life, of 1l. when interest is at 3, 3½, 4, or 5 *per cent.* And here it is proper to observe, that the column, marked *Age*, shews the different ages for which the value of an annuity is wanted; and the corresponding columns, marked 3 *per cent.* 3½ *per cent.* &c. express the value of the said ages in years purchase, and decimals of a year. Thus, an annuity for life, for the age of 40, is worth 14.84 years purchase, when interest is at 3 *per cent.* and only 13.98 years purchase, when interest is at 3½ *per cent.* And so in other cases.

Value of an annuity for life, of 1l. interest being

| Age. | 3 <i>per cent.</i> | 3½ <i>per cent.</i> | 4 <i>per cent.</i> | 5 <i>per cent.</i> |
|----------|--------------------|---------------------|--------------------|--------------------|
| 9 and 10 | 19.87 | 18.27 | 16.88 | 14.60 |
| 8, | 11 | 19.74 | 18.16 | 16.79 |
| 7, | 12 | 19.60 | 18.05 | 16.64 |
| | 13 | 19.47 | 17.94 | 16.60 |
| 6, | 14 | 19.33 | 17.82 | 16.50 |
| | 15 | 19.19 | 17.71 | 16.4 |
| | 16 | 19.05 | 17.59 | 16.31 |
| 5, | 17 | 18.90 | 17.46 | 16.21 |
| | 18 | 18.76 | 17.33 | 16.10 |
| | 19 | 18.61 | 17.21 | 15.99 |
| 4, | 20 | 18.46 | 17.09 | 15.89 |
| | 21 | 18.30 | 16.96 | 15.78 |
| | 22 | 18.15 | 16.83 | 15.67 |
| | 23 | 17.99 | 16.69 | 15.55 |
| 3, | 24 | 17.83 | 16.56 | 15.43 |
| | 25 | 17.66 | 16.42 | 15.31 |
| | 26 | 17.50 | 16.28 | 15.19 |
| | 27 | 17.33 | 16.13 | 15.04 |
| | 28 | 17.16 | 15.98 | 14.94 |
| | 29 | 16.98 | 15.83 | 14.81 |
| | 30 | 16.80 | 15.68 | 14.68 |
| 2, | 31 | 16.62 | 15.53 | 14.54 |
| | 32 | 16.44 | 15.37 | 14.41 |

| Age. | 3 <i>per cent.</i> | 3½ <i>per cent.</i> | 4 <i>per cent.</i> | 5 <i>per cent.</i> |
|------|--------------------|---------------------|--------------------|--------------------|
| | 33 | 16.25 | 15.21 | 14.27 |
| | 34 | 16.06 | 15.05 | 14.12 |
| | 35 | 15.86 | 14.89 | 13.98 |
| | 36 | 15.67 | 14.71 | 13.82 |
| | 37 | 15.46 | 14.52 | 13.67 |
| | 38 | 15.29 | 14.34 | 13.52 |
| 1, | 39 | 15.05 | 14.16 | 13.36 |
| | 40 | 14.84 | 13.98 | 13.20 |
| | 41 | 14.63 | 13.79 | 13.02 |
| | 42 | 14.41 | 13.59 | 12.85 |
| | 43 | 14.19 | 13.40 | 12.68 |
| | 44 | 13.96 | 13.20 | 12.50 |
| | 45 | 13.73 | 12.99 | 12.32 |
| | 46 | 13.49 | 12.78 | 12.13 |
| | 47 | 13.25 | 12.57 | 11.94 |
| | 48 | 13.01 | 12.36 | 11.74 |
| | 49 | 12.76 | 12.14 | 11.54 |
| | 50 | 12.51 | 11.92 | 11.34 |
| | 51 | 12.26 | 11.69 | 11.13 |
| | 52 | 12.00 | 11.45 | 10.92 |
| | 53 | 11.73 | 11.20 | 10.70 |
| | 54 | 11.46 | 10.95 | 10.47 |
| | 55 | 11.18 | 10.69 | 10.24 |
| | 56 | 10.90 | 10.44 | 10.01 |
| | 57 | 10.61 | 10.18 | 9.77 |
| | 58 | 10.32 | 9.91 | 9.52 |
| | 59 | 10.03 | 9.64 | 9.27 |
| | 60 | 9.73 | 9.36 | 9.01 |
| | 61 | 9.42 | 9.08 | 8.75 |
| | 62 | 9.11 | 8.79 | 8.48 |
| | 63 | 8.79 | 8.49 | 8.20 |
| | 64 | 8.46 | 8.19 | 7.92 |
| | 65 | 8.13 | 7.88 | 7.63 |
| | 66 | 7.79 | 7.56 | 7.33 |
| | 67 | 7.45 | 7.24 | 7.02 |
| | 68 | 7.10 | 6.91 | 6.75 |
| | 69 | 6.75 | 6.57 | 6.39 |
| | 70 | 6.38 | 6.22 | 6.06 |
| | 71 | 6.01 | 5.87 | 5.72 |
| | 72 | 5.63 | 5.51 | 5.38 |
| | 73 | 5.25 | 5.14 | 5.02 |
| | 74 | 4.85 | 4.77 | 4.66 |
| | 75 | 4.45 | 4.38 | 4.29 |
| | 76 | 4.05 | 3.98 | 3.91 |
| | 77 | 3.63 | 3.57 | 3.52 |
| | 78 | 3.21 | 3.16 | 3.11 |
| | 79 | 2.78 | 2.74 | 2.70 |
| | 80 | 2.34 | 2.31 | 2.28 |

There are a great many useful questions, the determination of which depends on the value of annuities for lives, joint lives, successive lives, &c. for which we refer to Mr. De Moivre's doctrine of chances and annuities for lives, and shall here only give the solution of a few, as being of most frequent use.

1. The values of two single lives being given,

given, to find the value of an annuity granted for the time of their joint continuance; or, the value of two single lives being given, to find the value of the joint lives.

Multiply together the values of the two lives, and reserve the product. Let that product be again multiplied by the interest of 11. and let that new product be subtracted from the sum of the values of the lives; and reserve the remainder. Divide the first quantity reserved by the second, and the quotient will express the value of the two joint lives.

Thus, supposing one life of 40 years of age, the other of 50, and interest at 5 *per cent.* the value of the first life will be found in the tables to be 11.83; the value of the second 10.35; and the product will be 122.4405, which product must be reserved. Multiply this again by the interest of 11; that is, by 0.05, and this new product will be 6.122025; which being subtracted from the sum of the values of the lives, or 22.18, the remainder will be 16.057975, and this is the second quantity reserved. Now dividing the first quantity reserved by the second, the quotient will be 7.62 nearly; and this expresses the value of the two joint lives.

2. The values of two single lives being given, to find the value of an annuity upon the longest of them; that is, of an annuity to continue so long as either of them is in being.

From the sum of the values of the joint lives, subtract the value of the joint lives, and the remainder will be the value of the longest.

Suppose, for instance, two lives, one worth 13 years purchase, the other 14, and interest at 4 *per cent.* The sum of the values of the lives is 27; the value of the two joint lives, by the rule before given, is 9.23; and subtracting 9.23 from 27, the remainder 17.77 is the value of the longest of the two lives.

3. The values of three single lives being given, to find the value of an annuity upon the longest of them:

Take the sum of the three single lives, from which sum subtract the sum of all the joint lives combined two and two; then to the remainder add the value of the three joint lives, and the result will be the value of the longest of the three lives.

Thus, supposing the single lives to be 13, 14, and 15 years purchase, the sum of the values will be 42; the value of

the first and second joint lives is 9.24; of the first and third, 9.65; of the second and third, 10.18; the sum of all which is 29.07; which being subtracted from the sum of the lives, that is, from 42, the remainder will be 12.93; to which adding the value of the three joint lives 7.41, the sum 20.34 will be the value of the longest of the three joint lives.

4. To find the present value of a remainder in fee, after a life of a given age. That is, supposing A to be in possession of an annuity for his life; and that B, after the decease of A, is to have the annuity for him and his heirs for ever, to find the present value of the remainder; or, as some call it, the reversion.

From the value of the fee simple, or perpetuity, subtract the value of the life in possession; what remains will be the present value of the reversion.

Thus, supposing that A is 60 years of age; an annuity upon his life, interest at 5 *per cent.* would be worth 8.39; which being subtracted from the value of the fee, or perpetuity 20, the remainder will be 11.61; which is the present value of the expectation of B.

By this rule, the value of an estate, subject to a jointure, may be determined.

In like manner, supposing that C were to have an annuity for him and his heirs for ever, after the lives of A and B; then from the perpetuity, or fee simple, subtracting the value of the longest of the two lives A and B, the remainder will express the value of C's expectation. Thus, supposing the age of A to be 40, and that of B to be 50, the value of an annuity upon the longest of these two lives would be found, by the foregoing rules, to be 14.56; and this being subtracted from the perpetuity 20, the remainder is 5.44; which is the present value of C's expectation.

5. To find the value of an annuity for life, after another annuity for life.

Suppose, for instance, that A is in possession of an annuity for his life, and that B, after the death of A, is to have the annuity for his life only, and that his heir, or representative, is to have nothing in case A survives B; what is the value of the life of B after the life of A.

From the present value of the life of B, subtract the present value of the joint lives of B and A, and the remainder will be the value of B's expectation.

LIFFEY, a river of Ireland, which rises in the county of Wicklow, and discharges itself into Dublin-bay.

LIGAMENT, in anatomy, a strong compact substance, serving to join two bones together.

A ligament is more flexible than a cartilage, not easily ruptured or torn, and does not yield, or at least very little, when pulled.

Some ligaments are designed to strengthen the joints, and to secure the bones in their several motions from parting from each other, as happens in luxations; other ligaments serve to connect cartilages with bones; and some there are which strengthen other parts, besides the bones and cartilages; of this last kind are the annular ligaments, so called, not so much from their figure as from their use, serving, like a ring, to bridle the tendons of many muscles. Some ligaments again are fixed to one or more bones, with different degrees of tension, and serve on each side for the insertion of muscles. To these may be added, the ligaments commonly termed aponeuroses; such as those of the temples, scapula, os humeri, ulna, palm of the hand, thigh, leg, and sole of the foot. Other differences of ligaments may be deduced from their consistence, solidity, situation and figure; some are almost cartilaginous, and others have a particular elasticity, by which they are capable of being drawn out by a sufficient force, and of contracting again when left to themselves.

LIGATURE, in surgery, is a chord, band or string; or the binding any part of the body with a chord, band, fillet, &c. whether of leather, linnen, &c.

Ligatures are used to extend and replace bones that are broken or dislocated; to tie the patients down in lithotomy and amputations; to tie upon the veins in phlebotomy, or the arteries in amputations, or in large wounds; to secure the splints that are applied to fractures; to tie up the processes of the peritonæum, with the spermatic vessels in castration; and, lastly, in taking off warts or other excrescences by ligature. For the manner of using them, see **LITHOTOMY**, **PHLEBOTOMY**, **FRACTURE**, &c.

LIGHT, *lux*, in physiology, certain subtle particles of matter, capable of exciting in us the sensation of colours.

Light undoubtedly consists of inconceiv-

ably small particles of matter, of different magnitudes; which are emitted or reflected from every point in the surface of a luminous body in right lines, and in all directions, with an unparalled velocity; and whose power or intensity decreases as the squares of the distance increase.

That light is a material substance, appears from its being propagated in time, and from its acting upon and producing great alterations in other bodies; but that its particles are inconceivably small appears from hence, that the greatest quantity of flame is found to have scarce any sensible gravity or weight: also because these particles pervade the pores of all transparent bodies, however hard or heavy. Yet small as they are, we find the rays of light consist of different sorts of these particles; and that this difference arises from their different magnitudes, seems evident from the different directions the several sorts of rays move in, after they have passed through a body of glass, water, &c. of some special figure, especially that of a prism. See the article **COLOUR**.

The divine wisdom and providence appear, perhaps, in nothing so remarkably as in the extreme subtilty of the particles of light: without this qualification it could not have pervaded the pores of bodies, and so we could have had none of those which we call diaphanous or transparent substances, and every thing but the surface of a body would have been concealed from the sight of mankind. Again, the velocity of a body is always as the quantity of matter inversely; and, therefore, the smaller the body, the greater velocity it is susceptible of from the same force; whence it comes to pass that light is thus qualified to be transmitted through immense distances in a small and insensible part of time; which thing was quite necessary, according to the present frame and state of nature.

But, lastly, it was absolutely necessary that the particles of light should be so exceeding small, that, when compounded with its velocity, it should produce no sensible force, as it must otherwise have done, and which, therefore, could not have been borne by the tender and delicate texture of the several parts of vegetable and animal bodies. To give an example: the velocity of a particle of light is found to be at the rate of

897600000 feet *per* second; suppose its matter to be but one millionth part of a grain, then its force to strike an object would be as $\frac{897600000}{1000000} = 897.6$ feet *per*

second, for one grain; or it would strike with the same force that one grain weight would do falling from half the height, *viz.* through 448.8 feet; which we should find to be very great, was the experiment to be made on the sensible coats of the eye.

Since the weight of bodies is proportional to the quantity of matter, it follows, that, where the latter is diminished indefinitely, the former will be so too; therefore, the weight of light must be insensible to ever so great a quantity of it.

Dr. Boerhaave caused a globe of iron, twelve inches in diameter, to be heated red-hot, and suspended at the end of a very exact ballance, and counterpoised by weights at the other end very nicely, and thus let it hang till all the particles of heat or light were escaped, when he found the equilibrium of the ballance no ways altered; which plainly proves the above thesis. See the article FIRE.

That the particles of light have not only magnitude, but that in different degrees also, is another, and perhaps the most subtle, discovery of the Newtonian philosophy. The comparative terms of greater and lesser are now as applicable to the particles of light, as to any other bodies. This is absolutely proved by the different refrangibility they are found to have in passing through a prismatic figure of glass or water; for the power of the prism detains the issuing particle, and draws it a little towards the surface; and, since this power is the same, it would have the same effect on all the particles of light, if they were all of an equal magnitude, because they have all an equal velocity. But since this effect is different among the particles, some being detained and drawn aside to a greater distance than others, it follows, they must be less in magnitude, to become more subject to the influence of the attracting surface; in like manner as the electric effluvia will act upon and agitate very small and light bodies, much sooner and more easily than they can move those which are larger. But of this more when we come to speak of the manner in which this power acts in refracting the rays of light. See REFRACTION.

If light were not reflected from every point in the surface of a body in all directions every way, there might be assigned a point of space where a ray of light, from such a point in the surface, does not come; and there the said point of the surface could not be visible: but because the eye can find no point of space in all the visible hemisphere respecting that point, but where it is visible; therefore a ray of light is reflected from that point to every part of space, from whence a right line to that point can be drawn.

That the rays of light proceed in a right-lined direction, is evident from hence, that whatever the figure of the body be, if it be held perpendicular to the rays of light, it will always cast a shadow of the same figure against a parallel plane. Thus a circle will produce a circular shadow, a triangle a triangular one, and so on. Which plainly shews that the rays of light pass by the extremities of these bodies in right-lined directions, excepting these only which pass contiguous to the edges of the body; for they will be a little inflected, which will cause the extremity of the shadow to be not so distinct and well defined as it otherwise would be; of which we shall take farther notice hereafter.

As all the other affections of light, so that of its velocity was utterly unknown to all the antient, and most of the modern philosophers, who, before the time of Mr. Romer, were of opinion that the motion of light was instantaneous, or that it was propagated through immense spaces in an instant. But Mr. Romer, and other philosophers, about this time, making frequent observations on the eclipses of Jupiter's moons, found that the time of these eclipses did not correspond to the calculations founded upon the astronomical tables; where the times are all calculated for the distance of the center of the sun, and consequently where the eye of the spectator must be supposed to be in viewing the said eclipses, occultations, &c. of Jupiter's moons. To illustrate this matter, let S (plate CLVIII. fig. 2. n° 1.) be the center of the sun, A B the orbit of mercury, C D the orbit of venus, E F that of the earth, and G H a part of the orbit of Jupiter. Let I be the body of Jupiter, and K L its shadow; O M N the orbit of one of Jupiter's moons, M just entering the shadow of Jupiter. Now a spectator at S would

would observe the moon M to enter the shadow, just at the time which is calculated from the tables: but a spectator on the earth, at T, always observes it to happen sooner; and, when the earth is in the opposite part of its orbit R, he will always observe it to happen later, by the space of about seven minutes, in both cases. This observation gave the first proof that light was progressive, and took up about fourteen minutes to pass over the diameter of the earth's orbit from T to R, or seven minutes to pass from the sun S to the earth T.

But this, though a sufficient discovery or proof of the progressive motion of light, was yet but an experiment in the gross, and not accurate to determine or define the true rate of velocity which properly belonged to light: the solution of this noble problem was reserved for Dr. Bradley, who by reiterated and certain experiments, observed, that the bright star in the head of draco appeared $39''$ more northerly in September than in March, just the contrary way to what it ought to appear by the annual parallax of the stars, which must arise from the velocity of light bearing some proportion to that of the annual motion of the earth, and is called aberration of light. See STAR.

To illustrate this, and from thence to determine the velocity of light: let AB (*ibid.* n^o 2.) represent a part of the earth's annual orbit, and let C be a star observed by a spectator at the earth at A; when the earth arrives at B, the star will not be observed at C, as before, but at D in the line BD parallel to AC; for let AB be divided into equal parts Aa, ab, bc, cd, and dB; then through these points draw the lines ae, bf, cg, dh, parallel to AC and DB. Now let the velocity of the earth be to that of the light as AB to CB. When the earth sets out from the point A, suppose the ray of light commences its motion from the star at C in the direction CB perpendicular to AB; then it is plain, when the earth is arrived at a, the particle of light will be got to i, the point where ae cuts BC, and the star will be seen in the direction ai and appear at e. In like manner, when the earth is at b, the particle of light will be come to k, and will appear at f, and so on; when the earth is at c, d, B, the particle will be at l, m, and B, and the star will appear at g, h, and D. If therefore the line CA represents the

axis of a telescope, making the angle BAC with the direction of the earth's motion AB; when the spectator comes to B, he will see the star at D, which he could not do, if the telescope was directed in the perpendicular line BC; but the difference of the positions of the lines DB and BC, or the angle DBC, is so very small as to amount to no more than $20''$ $15'''$, which gives the proportion of the sides BC to CD or AB, as 10210 to 1; which shews that the velocity of light is 10210 times greater than the velocity of the earth in her orbit. But the velocity of the earth is known, which is about 500,000,000 miles in 365 days, or about 56,000 miles *per* hour; whence the velocity of light will be found to be such as carries it through the space of 170,000 miles, or 897,600,000 feet in one second; and, therefore, it will pass from the sun to us in $8'$ and $13''$.

If a cannon will throw a ball one mile perpendicular height, or 5280 feet, the velocity with which it goes from the cannon's mouth is the uniform velocity of 10,560 feet *per* $18\frac{1}{4}''$, (which is the time of the perpendicular ascent or descent) and, therefore, the velocity of the cannon-ball is 578 feet *per* second. Whence the velocity of light is, to that of the cannon-ball, as 897,600,000 to 578, or as 1,550,000 to 1, nearly.

The doctor found that the parallax of the fixed stars, instead of amounting to many seconds, as some have deduced from their observations, does not make one second; and from thence it follows that the abovementioned star, in draco, is about 400,000 times farther from us than the sun; and, consequently, that the light takes up above $493'' \times 400,000 = 197,200,000$ seconds (which is more than six years) in coming from that star to us.

For the properties of reflected and refracted light, see the articles REFLECTION and REFRACTION.

LIGHT, is also used to denote the disposition of objects, with regard to the receiving of light: thus, the doors, windows, &c. of houses, are called lights. For the lights and shades of paintings, &c. see CLARO-OBSCURO.

LIGHT, in the manege, a term used in various senses: thus a light horse, is a swift runner: but the same term is also given to a horse that is well-made, tho' he is neither swift nor active; for we

here

here consider only the shape and make of the horse, without regard to his qualities. We call a coach-horse light, when he stirs nimbly and dreads the whip. In this sense, all light coach-horses are good; and a hard heavy coach-horse, that takes the lashing easily, is good for nothing. For light upon the hand, and light-horse, see HAND and HORSE.

LIGHT-HOUSE, in maritime affairs, a building on the sea-shore, a promontory, a rock, &c. wherein is kept a light, during the night, in order to direct vessels sailing near the place.

LIGHTENING, in physiology, the bursting of fire from a cloud.

From repeated experiments, it appears, that lightening is only electrical fire drawn off from the clouds: and, in effect, this electricity has been collected during thunder in iron-bars, or in tin-tubes, in many parts of Europe. See the article **ELECTRICITY**.

Thunder then, or lightening, is in the hand of nature, what electricity is in ours; the wonders which we now exhibit at pleasure, are only little imitations of those great effects which frighten us. A cloud prepared by the action of winds, by heat, by a mixture of exhalations, &c. is the electrified body; and watery clouds, or terrestrial matter, the non-electrics which excite it. See the article **THUNDER**.

The dreadful effects of lightening, as killing men and other animals, demolishing houses, splitting trees, &c. are too well known to be insisted on here. It has also been known to render iron magnetical, and to reverse the polarity of needles; and the same effects may be produced by electricity; and indeed, says the abbe Nollet, the universality of the electric matter, the readiness of its action, its inflammability, its property of striking bodies both externally and internally, even to their smallest parts, and of giving fire to them; all these points of analogy make it probable that lightening and electricity are owing to the same causes.

LIGHTER, in naval architecture, a large kind of boat, used in the river of Thames for carrying heavy goods, as coals, timber, &c.

LIGHTNESS, or **LEVITY OF BODIES**. See the article **LEVITY**.

LIGNICENSIS terra, in the materia medica, the name of a fine yellow bole, dug in many parts of Germany, parti-

cularly about Emeric in the circle of Westphalia, and used in cordial and astringent compositions. It is a common succedaneum for the yellow silesian bole, where that is not to be had, and is generally esteemed very nearly, if not absolutely, equal to it in its virtues. It is moderately heavy, naturally of a smooth surface, and of a beautiful gold-colour. It easily breaks between the fingers, and does not stain the skin in handling, and melts freely in the mouth, but generally leaves a little grittiness between the teeth. It makes no effervescence with acids; and burns not to a red, but to a pale brown, and almost to a stone hardness. Charlton says it is more frequently known by the name of *terra sigillata golthergensis*.

LIGULATED, among botanists, an appellation given to such floscules as have a straight end turned downwards, with three indentures, but not divided into segments. See plate **CLVIII**. fig. 4.

LIGUSTICUM, **LOVAGE**, in botany, a genus of the pentandria digynia class of plants, the general corolla of which is uniform, and the single flowers consist each of five lanceolated petals, bent inwards at the points: the fruit is naked, oblong, angulated, sulcated, and separable into two parts; and containing two oblong, smooth seeds, plain on one side, and striated on the other.

Under this genus are comprehended the filer, cicutaria, and levisticum of authors. The root and seeds of lovage are accounted carminative, aromatic, and sudorific; and prescribed with success in malignant fevers, colics, apoplexies, and disorders of the head.

LIGUSTRUM, **PRIVET**, in botany, a genus of trees, belonging to the dian-dria monogynia class of plants, with a funnel-fashioned flower, quadrifid or quinquifid at the limb: the fruit is a globose, smooth berry, with only one cell, containing four seeds convex on one side, and angulated on the other. See plate **CLVIII**. fig. 5.

Privet leaves and seeds are esteemed cooling, drying, and astringent; and therefore recommended in putrid disorders of the gums, inflammations, and the like.

LIKE, in geometry, &c. denotes the same as similar. See the article **SIMILAR**.

LILIACEOUS, an appellation given to such flowers, as resemble that of the lily. See the article **LILY**.

LILIUM, the lily. See the next article.

LILY, **LILIUM**, in botany, a genus of the

the hexandria monogynia class of plants, with a campanulated flower, rising narrow out of the cup, and expanding towards the limb: it consists of six erect petals, obtuse at the points, which are bent backwards: the fruit is an oblong capsule, with three cells, in which are contained a great many small seeds. See plate CLVIII. fig. 3.

White lily-roots are emollient, and suppurative; being used with success in cataplasms, intended for these purposes. The flowers are also emollient and anodyne. They are only used externally, and that either in the form of a cataplasm, or of an oil by insolation.

LIMA, a province of Peru, in South America; the capital of which, called also Lima, was almost entirely destroyed by an earthquake, in 1746: west long. 76°, and south lat. 12° 30'.

LIMALE, a town of Brabant, thirteen miles south-west of Brussels.

LIMAX, the snail, in zoology, the animal that inhabits the murex-shell. See the articles SNAIL and MUREX.

LIMB, in a general sense, denotes the border or edge of a thing: thus, we say, the limb of a quadrant, of the sun, of a leaf, &c.

LIMB, in anatomy, an appellation given to the extremities of the body, as the arms and legs. See ARM and LEG.

LIMB, *limbus*, in the church of Rome, is used in two different senses. 1. The limb of the patriarchs is said to be the place, where the patriarchs waited the redemption of mankind: in this place, they suppose our Saviour's soul continued from the time of his death to his resurrection. 2. The limb of infants, dying without baptism; a place supposed to be distinct both from heaven and hell; since, say they, children dying innocent of any actual sin do not deserve hell; and by reason of their original sin cannot be admitted into heaven.

LIMBER-HOLES, little holes cut thro' the floor-timbers of a ship, serving to convey the bilge-water to the pump.

LIMBURG, the capital of a dutchy of the same name, in the Austrian Netherlands, twenty miles south-east of Liege: east long. 6° 5', and north lat. 50° 37'.

LIME, *calx*, a soft, friable, substance obtained by calcining or burning stones, shells and the like.

There are so many species of stone capable of being burnt into lime, and so many that in the different parts of the

world are really put to that use, that it would be difficult to affix any particular idea to the term lime-stone; but we are to understand by it in general, any stone, that upon a proper degree of heat continued a sufficient time, becomes a white calx, which will make a great ebullition and noise on being thrown into water, and will, in fine, fall into a loose white powder at the bottom of that liquor; after having very strongly impregnated it with its soluble particles. The most common kind of lime-stone, is a greyish or bluish stone, found in loose masses, and often veined with red: marble, alabaster, and all the stones that have spar for their basis, may also come under the general denomination of lime-stone, since they all burn into lime. In general, every stone, of whatever kind or colour, that will ferment with aqua fortis, will also burn into lime, and it is of no consequence to the medicinal use of that calx, whether it be made of the one or the other of these stones. What lime we have in London is made of chalk, which is weaker than that made of stone; but it is otherwise the same.

The kilns used for making lime, are commonly built in a large pit; they are wide at the top, and grow narrow by degrees, as they approach nearer to the bottom: on the outside, near the bottom of the kiln, there is door, at which the ashes are taken out, and just above that an iron-grate: upon this is placed a layer of stone, or whatever else is to be burnt for making lime, and upon that a layer of wood or coals, which is repeated till the kiln is full, only observing, that the outmost layer must be wood or coals. Chalk is commonly burnt in twenty-four hours, but stone often takes up sixty hours: ten bushels of sea-coal, or a hundred of faggots three feet long, will burn forty bushels of chalk, and forty bushels of chalk will yield thirty bushels of unslacked lime.

The best lime is that made of the hardest stone; it is not only used by architects, builders, plasterers, dyers, sugar-refiners, tanners, and many other mechanics, but is an excellent manure for land, where it is sandy, or a mixed gravel; but it is not fit for a cold gravel or clay soil. In many places it is carried out and laid in heaps, allowing a bushel to a pole-square, or a hundred and sixty bushels to an acre. The best method of ordering it, is to mix it with dung, mud, or fresh

fresh earth, and to spread it to over the earth the year before it is plowed.

Lime is also of great service in medicine, for which use, it is to be chosen in clean, light, and hard pieces, but not stony, such as will not easily crumble to pieces between the fingers, and yet will readily break when thrown into water. The best lime in the world, on being long exposed to a damp air, will moulder into a powder, and lose all its medicinal virtues. Lime in its perfect and unaltered state, as newly taken from the kiln, is called *calx viva*, or quick-lime: that which has lain in the air till it has fallen into powder, is called *calx extincta*; and that which has been thrown into water, and the powder it has fallen into afterwards washed with several fresh waters, is called *calx lota*.

Quick-lime is burning and corrosive, and is never given internally; but it is sometimes used in external applications, as made into a paste with orpiment, soap, &c. and used as a depillatory. The *calx lota* is no longer a corrosive, but a powerful desiccative; and lime-water is of great service internally in all cutaneous eruptions, in the cure of obstinate ulcers, and for diseases of the lungs: for this purpose it is generally to be continued a considerable time.

The preparations of lime in use in the shops are, the simple lime-water; the less compound lime-water; the more compound lime-water; and several kinds of caustics, which see under the article **CAUSTIC**.

Simple lime-water is made in the following manner: Put a pound of quick lime into a large earthen-pan; pour upon it, by a little at a time, a gallon and a half of water; after the ebullition is thoroughly over, let the liquor stand to settle, and then pour it clear off, and filter it for use. This is principally intended for washing old ulcers, and other external purposes; when it is to be taken internally, the following additions are made to it, to take off its flavour, or to add to its virtues. Take of liquorice-root, an ounce; of saffraas-bark, half an ounce; simple lime-water, three quarts; let the whole infuse together for two days without heat, then filter it for use: this last preparation is called the less compound lime-water. The more compound lime-water is made thus: Take raspings of guaiacum, half a pound; liquorice-root, an ounce; saffraas-bark,

half an ounce; of coriander-seed, three drams; of lime-water three quarts; let the whole stand together two days without heat; and then filter it off for use.

It has been found by several late experiments, made by Dr. Alston, that lime-water is an excellent remedy for the stone; and that it has also been given with extraordinary success in acute fevers. Sponius says, that when drank with milk or whey, it performs wonderful effects in internal ulcers, diarrhoeas, and the dysentery.

Lime-water on being mixed with linseed-oil, or the oil of olives, and well shaken, acquires the consistence of a balsam, which is of a singular service when applied externally in fresh burns, and also conduces to stop inflammations. It may also be impregnated with copper, by standing in a brazen basin: by which means it assumes a beautiful sapphire colour, and proves an excellent remedy against pustules, ulcers, scabies, and itching of the eyes; and this last preparation mixed with a little sal ammoniac, is recommended against all humours, films, and other blemishes of the eyes, and is said to be very efficacious when the eyes are hurt by the small-pox; and there is no remedy more effectual for cancerous ulcers.

BIRD-LIME. See the article **BIRD-LIME**.

LIME-PHOSPHORUS. See **PHOSPHORUS**.

LIME TREE, the english name of the *tilia*.

See the article **TILIA**.

LIMERIC, the capital of a county of the same name in Ireland, situated on the river Shannon, fifty-two miles north of Cork: west long. $8^{\circ} 30'$, north lat. $52^{\circ} 35'$.

LIMINGTON, or **LEMINGTON**, a borough-town of Hampshire, twelve miles south west of Southampton. It sends two members to parliament.

LIMIT, in a restrained sense, is used by mathematicians for a determinate quantity to which a variable one continually approaches; in which sense, the circle may be said to be the limit of its circumscribed and inscribed polygons. In algebra, the term limits is applied to two quantities, one of which is greater, and the other less, than another quantity; and in this sense it is used, in speaking of the limits of equations, whereby their solution is much facilitated.

Let any equation, as $x^3 - p x^2 + q x - r = 0$ be proposed; and transform it into

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the following equation. See the article TRANSFORMATION.

$$\left. \begin{array}{l} y^3 + 3ey^2 + 3e^2y + e^3 \\ -py^2 - 2pey - pe^2 \\ + qy + qe \\ - r \end{array} \right\} = 0$$

Where the values of y are less than the respective values of x , by the difference e . If you suppose e to be taken such as to make all the coefficients of the equation of y positive, viz. $e^3 - pe^2 + qe - r$, $3e^2 - 2pe + q$, $3e - p$; then there being no variation of the signs in the equation, all the values of y must be negative; and consequently the quantity e , by which the values of x are diminished, must be greater than the greatest positive value of x : And, consequently, must be the limit of the roots of the equation $x^3 - px^2 + qx - r = 0$.

It is sufficient therefore, in order to find the limit, to enquire what quantity substituted for x , in each of these expressions $x^3 - px^2 + qx - r$, $3x^2 - 2px + q$, $3x - p$, will give them all positive; for the quantity will be the limit required.

Having found the limit that surpasses the greatest positive root, call it m . And if you assume $y = m - x$, and for x substitute $m - y$, the equation that will arise will have all its roots positive; because m is supposed to surpass all the values of x , and consequently $m - x (= y)$ must always be affirmative. And, by this means, any equation may be changed into one that shall have all its roots affirmative.

Or, if $-n$ represent the limit of the negative roots, then by assuming $y = x + n$ the proposed equation shall be transformed into one that shall have all its roots affirmative; for $+n$ being greater than any negative value of x , it follows that $y = x + n$ must be always positive.

What is here said of the above cubic equation, may be easily applied to others; and of all such equations, two limits are easily discovered, viz. o , which is less than the least; and e , found as above, which surpasses the greatest root of the equation. But besides these, other limits still nearer the roots may be found; for the method of doing which, the reader may consult Maclaurin's Algebra, p. 175, seq.

LIMITS of a planet, its greatest excursion from the ecliptic, or, which is the same thing the points of its greatest latitude.

LIMITATION, in law, signifies a certain space of time allowed for bringing actions

in. Thus by the statute of the 21 Jac. I. c. 16. it is ordained, that all writs of formedon, &c. for title to lands in being, must be sued out within twenty years after the title arose, and actions of debt upon the case, actions upon a stated account, of detinue, trover and trespass, must be commenced within six years after the cause of action, and not afterwards: actions of assault and battery must be brought within four years after the cause of action; and for slander, within two years. Though an action may be barred by statute, yet a fresh promise will revive it. It is said, that twenty years possession of land is a good title in a person to maintain an action of ejectment, though he be not at that time actually possessed thereof: but where the plaintiff is out of possession more than such a number of years, it will bar him the statute. See PRESCRIPTION.

LIMITATION OF ESTATE, is the length of time an estate is to continue in the possession of a person or family. As where a person grants lands to a person and his heirs male, and on default of such issue, to his heirs female; here the daughters cannot inherit so long as there is a male heir, because the estate is first limited to the heirs male.

LIMITED PROBLEM, a problem that admits but of one solution, as to make a circle pass through three given points, not lying in the same right line. See the article PROBLEM.

LIMMA, in music, an interval in the scale of the antients, expressed by $\frac{256}{243}$. See the article INTERVAL.

LIMNING, the art of painting in water-colours, in contradistinction to painting, which is done in oil-colours. See the article PAINTING.

Limning is by far more antient than painting in oil; this last being first invented by John Van Eyck, a Flemish painter, in 1410.

In limning, all colours are proper enough, except the white, made of lime, which is only used in fresco. The azure and ultramarine must always be mixt with size or gum: but there are always applied two lays of hot size, before the size colours are laid on: the colours are all ground in water, each by itself, and as they are required in working, are diluted with size-water.

When the piece is finished, they go over it with the white of an egg, well beaten, and then with varnish, if required.

To

To limn or draw a face in colours: having all the materials in readiness, lay the prepared colour on the card even and thin, free from hairs and spots, over the place where the picture is to be. The ground being laid and the party placed in a due position, begin the work, which is to be done at three sittings; at the first, you are only to dead colour the face, which will require about two hours. At the second sitting, go over the work more curiously, adding its particular graces or deformities. At the third sitting, finish the whole; carefully remarking whatever may conduce to render the piece perfect, as the cast of the eyes, moles, scars, gestures, and the like.

LIMODORUM, in botany, a genus of the gynandria-diandria class of plants, the flower of which consists of five oblong petals, and the nectarium hollow, and formed of a single leaf: the fruit is a columnar unilocular capsule, containing a great number of very small seeds.

LIMOGES, a city of France, a hundred miles north-east of Bourdeaux.

LIMON, the **LEMON TREE**, is made by Linnæus a species of citrus. See **CITRUS**.

LIMOSELLA, in botany, a genus of the didynamia-angiospermia class of plants, the flower of which consists of one erect petal, divided into five segments; and its fruit is an unilocular capsule, containing a great many seeds.

LIMPET, the english name of a shell-fish, called by authors patella. See **PATELLA**.

LINARIA, the **LINNET** in ornithology. See the article **LINNET**.

LINCOLN, the capital city of the county of Lincoln: west long. 27', north lat. 53° 16'. It sends two members to parliament.

LINDSEY, the north division of Lincolnshire.

LINE, *linea*, in geometry, a quantity extended in length only, without any breadth or thickness. It is formed by the flux or motion of a point. See **FLUXION**. There are two kinds of lines, *viz.* right lines and curve lines. If the point A, (pl. CLVIII. fig. 6. n° 1.) move towards B; by its motion, it describes a line, and thus, if the point go the nearest way towards B, will be a right or straight line, whose distinction therefore is the nearest or shortest distance between any two points; or a line, all whose points tend the same way. If the point go any way about, as in one of the lines A B C, or A c B, it will trace out either a crooked

line, as the upper A c B, or else two more straight ones, as in the lower A C B. Right lines are all of the same species, but curves are of an infinite number of different species. We may conceive as many as there may be different ratios between their ordinates and abscissæ. See the articles **ASCISS** and **ORDINATE**.

Curve lines are usually divided into geometrical and mechanical; the former are those which may be found exactly in all their points; the latter are those, some or all of whose points are not to be found precisely, but only tentatively, or nearly. Curve lines are also divided into the first order, second order, third order, &c. See the article **CURVE**.

Lines considered as to their positions, are either parallel, perpendicular, or oblique, the construction and properties whereof see under **PARALLEL**, &c.

Euclid's second book treats mostly of lines, and of the effects of their being divided and again multiplied into one another.

LINE, in geography, the same with equator. See the article **EQUATOR**.

LINES in astronomy, are, 1. Fiducial line, the line or ruler which passes thro' the middle of an astrolabe, or the like instrument, and on which the sights are fitted, otherwise, called alhidade, index, dioptra, and medecinium. See the article **ASTROLABE**. 2. The horizontal line. 3. Isochronal line. 4. Meridian line. 5. Line of the nodes. See the articles **HORIZONTAL**, **ISOCHRONAL**, **MERIDIAN** and **NODES**.

LINES in perspective, are, 1. Geometrical line, which is a right line drawn in any manner on the geometrical plane. 2. Terrestrial line, or fundamental line, is a right line wherein the geometrical plane, and that of the picture or draught intersect one another, such is the line N I, (plate *ibid.* n° 2.) formed by the intersection of the geometrical plane L M, and the perspective plane H K. 3. Line of the front, is any right line parallel to the terrestrial line. 4. Vertical line, the common section of the vertical and of the draught. 5. Visual line, the line or ray imagined to pass from the object to the eye. 6. Line of station, according to some writers, is the common section of the vertical and geometrical planes. Others, as Lamy, mean by it the perpendicular height of the eye above the geometrical plane. Others a line on that plane, and perpendicular to the line expressing

pressing the height of the eye. 7. Objective line, the line of an object from whence the appearance is sought for in the draught or picture.

LINE of distance. See the article DISTANCE.

LINES, in dialling, are, 1. Horizontal line, the common section of the horizon and the dial-plane. See DIAL. 2. Horary lines, or hour-lines, the common intersections of the hour-circles of the sphere, with the plane of the dial. See HORARY. 3. Substylar line, that line on which the style or cock of a dial is duly erected, and the representation of such an hour-circle as is perpendicular to the plane of that dial. 4. Equinoctial line, the common intersection of the equinoctial and plane of the dial.

Contingent LINE. See CONTINGENT.

LINE of measures, is used by Oughtred, to denote the diameter of the primitive circle in the projection of the sphere in plano, or that line in which the diameter of any circle to be projected falls. In the stereographic projection of the sphere in plano the line of measures is that line in which the plane of a great circle perpendicular to the plane of the projection, and that oblique circle which is to be projected, intersects the plane of the projection; or it is the common section of a plane passing through the eye-point and the center of the primitive at right angles to any oblique circle which is to be projected, and in which the center and pole of such circle will be found.

LINE of direction on the earth's axis, in the pythagorean system of astronomy, the line connecting the two poles of the ecliptic and of the equator when they are projected on the plane of the former.

LINE of direction, in mechanics, that wherein a body actually moves, or would move, if it were not hindered. It also denotes the line that passes thro' the center of gravity of the heavy body to the center of the earth, which must also pass thro' the fulcrum, or support of the heavy body, without which it would fall.

LINE of gravitation, of any heavy body, a line drawn through its center of gravity, and according to which it tends downwards.

LINE of the swiftest descent, of a heavy body is the cycloid. See CYCLOID.

LINE of a projectile. See PROJECTILES.

LINES on the plain scale, are the line of chords, line of sines, line of tangents, line of secants, line of semitangents, line of leagues; the construction and ap-

plication of which see under the words SCALE, SAILING, &c.

LINES on Gunter's scale, are the line of numbers, line of artificial sines, line of artificial tangents, line of artificial versed sines, line of artificial lines of rhumbs, line of a artificial tangents of the meridian line, and line of equal parts; for the construction and application whereof, see GUNTER'S SCALE.

LINES of the sector, are the line of equal parts, or line of lines, line of chords, line of sines, line of tangents, line of secants, line of polygons, line of numbers, line of hours, line of latitudes, line of meridians, line of metals, line of solids, line of planes; for the construction and use whereof, see the article SECTOR.

LINES, in fortification, are those of approach, capital, defence, circumvallation, contravallation, of the base, &c. See the articles APPROACH, &c.

To LINE a work, signifies to strengthen a rampart with a firm wall; or to encompass a parapet or moat with good turf, &c.

LINE, in the art of war, is understood of the disposition of an army, ranged in order of battle, with the front extended as far as may be, that it may not be flanked. See the article ARMY.

LINE of battle, is also understood of the disposition of a fleet on the day of engagement, on which occasion the vessels are usually drawn up as much as possible in a straight line, as well to gain and keep the advantage of the wind, as to run the same board.

Ship of the LINE, a vessel large enough to be drawn up in the line, and to have a place in a sea-fight. See the article SHIP.

LINE, in fencing, that part of the body opposite to the enemy, wherein the shoulders, the right arm, and the sword, ought always to be found; and wherein are also to be placed the two feet at the distance of eighteen inches from each other. In which sense a man is said to be in his line, or to go out of his line, &c.

LINE of demarcation, or *Alexandrian LINE*, a meridian passing over the mouth of the river Moragnon, and by the capes Houmas and Mallabrigo, so called from pope Alexander VI. who, to end the dispute between the crowns of Castile and Portugal, about their boundaries, drew an imaginary line on the globe, which was to terminate the pretensions of each. By this partition, the East-Indies fell to the share of the Portuguese, and the West-Indies to the Castilians.

LINE of the Synodical, in reference to some theories of the moon, is a right line supposed to be drawn through the centers of the earth and sun: and, if it be produced, quite through the orbits: it is called the *line of the true syzygies*: but a right line imagined to pass through the earth's center, and the mean place of the sun, is called the *line of the mean syzygies*.

LINE, in genealogy, a series or succession of relations in various degrees, all descending from the same common father. Direct line, is that which goes from father to son; being the order of ascendants and descendants.

Collateral line, is the order of those who descend from some common father related to the former, but out of the line of ascendants and descendants: in this are placed uncles, aunts, cousins, nephews, &c. See **DIRECT** and **COLLATERAL**.

LINE also denotes a french measure, containing the twelfth part of an inch, or the hundred and forty-fourth part of a foot. Geometricians conceive the line subdivided into six points. The french line answers to the english barley-corn. See the articles **FOOT**, **INCH**, &c.

LINES, in music, the name of those strokes drawn horizontally on a piece of paper, on and between which the characters and notes of music are disposed: their number is commonly five; when another is added, for one, two, or more notes, it is called a ledger-line.

LINES, in heraldry, the figures used in armories, to divide the shield into different parts, and to compose different figures. These lines, according to their different forms and names, give denomination to the pieces or figures which they form, except the straight or plain lines.

LINES, among fowlers, is used to express the things by which they catch birds.

LINEA ALBA, in anatomy, the concourse of the tendons of the muscles of the abdomen, extending from the sternum to the juncture of the ossa pubis, in form of a broad and strong white streak, and dividing the abdomen into two. See the article **ABDOMEN**.

LINEAMENT, among painters, is used for the out-lines of a face. See the article **CONTOUR**.

LINEAR NUMBERS, in mathematics, such as have relation to length only; such is a number which represents one side of a plane figure. If the plane figure be a square, the linear number is called a *root*.

LINEAR PROBLEM, that which may be solved geometrically, by the intersection of two right lines. This is called a simple problem, and is capable but of one solution.

LINEN, or **LINNEN**. See **LINNEN**.

LING, in ichthyology, the cirrated gadus with two back-fins, and with the upper jaw longest; a fish called by authors *asellus longus*. See the article **GADUS**.

LINGEN, a town of Germany, in the circle of Westphalia, capital of a county of the same name, situated on the river Ems, forty-five miles north of Munster.

LINGUATULA, in ichthyology, a species of pleuronectes. See the article **PLEURONECTES**.

LINIMENT, *linimentum*, in pharmacy, a composition of a consistence somewhat thinner than an unguent, and thicker than an oil, used for anointing different parts of the body in various intentions.

The materials proper for composing of a liniment, are oils, fats, balsams, and whatever enters the composition of unguents and plasters.

The best way of using liniments, is to apply them after the pores have been opened by frictions or fomentations.

There are many sorts of liniments directed in pharmaceutical writers; but we shall content ourselves with giving that called *linimentum Arcæi*, prepared as follows; take of gum elemi, and turpentine of fir, of each an ounce and half; of old and depurated mutton-suet, two ounces; of old and depurated hog's lard, an ounce: mix them, and make an ointment.

Oils, unguents, and the fat of animals, or whatever any part is anointed with, are comprehended under the name *liniment*.

LINLITHGOW, a town of Scotland, in the county of Lothian, capital of the territory of Linlithgow, situated sixteen miles west of Edinburgh.

LINNÆA, in botany, a genus of the *dynamia-angiospermia* class of plants, the corolla of which is monopetalous, turbinate, semi-quinquid, obtuse, almost equal, and greater than double the cup of the flower; the fruit is a roundish bilocular berry; the seeds are solitary and roundish.

LINNEN, in commerce, a well known kind of cloth, chiefly made of flax. See **FLAX**. In order to succeed in the linen-manufacture, one set of people should be confined to the plowing and preparing the soil, sowing and covering the seed, to the weeding,

weeding, pulling, rippling, taking care of the new seed, and watering and grafting the flax, till it is lodged at home: others should be concerned in the drying, breaking, scrutching, and heckling the flax, to fit it for the spinners; and others in spinning and reeling it, to fit it for the weaver; others should be concerned in taking due care of the weaving, bleaching, beetling, and finishing the cloth for the market. It is reasonable to believe, that if these several branches of the manufacture were carried on by distinct dealers in Scotland and Ireland, where our home-made linnens are manufactured, the several parts would be better executed, and the whole would be afforded cheaper, and with greater profit. But without entering farther into the nature of this manufacture, we shall content ourselves with giving the bounty on british and irish linnens exported, and the duties on those imported from foreign countries; only first observing that the use of all french cambrics and lawns is prohibited in Great Britain, but may be imported upon the importer's making oath that they are intended for exportation only, and giving a bond for the payment of 5 l. for every piece of cambric that shall not be exported within the term of three years after being entered. The use of callicoes, printed, painted, stained, and dyed, and brought from India, Persia, and China, is also prohibited; these are to be brought to no port but that of London, where they are to be duly entered, and secured in warehouses, till their exportation.

The exporter of british and irish linnens, that are neither striped, chequered, nor made into buckram, who sends them to Africa, America, Spain, Portugal, Gibraltar, or Minorca, shall be allowed $\frac{1}{2}$ d. for every yard of linnen under the value of 5 d. per yard; and $1\frac{1}{2}$ d. for every yard of the value of 5 d. and not exceeding the value of 1 s. 6 d.

The principal duties on foreign linnen imported, pay as follow: holland damask tabling of the breadth of two ells, and under three ells, pay,

on being imported, 5 s. $\frac{60\frac{1}{2}}{100}$ d. the yard; and draw back on exportation 4 s. $6\frac{90\frac{1}{2}}{100}$ d.

Ditto, of the breadth of three ells or upwards, pay on importation 7 s. $10\frac{35\frac{1}{2}}{100}$ d.

the yard, and draw back on exportation

7 s. $4\frac{65\frac{1}{2}}{100}$ d. Holland diaper, of the breadth of two ells, and under three ells, pay on importation 2 s. $3\frac{27\frac{1}{4}}{100}$ d. the yard, and draw back on exportation 2 s. $\frac{70\frac{3}{4}}{100}$ d.

D^o, of the breadth of three ells, or upwards, pay on importation 3 s. $6\frac{46}{100}$ d. the yard

and draw back on exportation 3 s. $3\frac{89\frac{1}{2}}{100}$ d.

Holland diaper napkins, the dozen, pay on importation 6 s. $6\frac{71\frac{2}{5}}{100}$ d. and draw

back on exportation 5 s. $8\frac{45\frac{2}{5}}{100}$ d. Holland

diaper towelling and napkining, not exceeding an ell and $\frac{1}{8}$ in breadth, pay on importation $6\frac{56}{100}$ d. the yard; and draw

back on exportation $5\frac{70\frac{1}{2}}{100}$ d. Silesia dia-

per towelling and napkining, pay on importation $3\frac{47\frac{4}{5}}{100}$ d. the yard; and draw

back on exportation $3\frac{9\frac{4}{5}}{100}$ d. Bag, bra-

bant, and brown holland, embden, fleemish, frieze, gentish, isingham, overysfel, and rouse-cloth, not exceeding $1\frac{1}{8}$ ell english in breadth, pay on importation

$10\frac{93\frac{1}{4}}{100}$ d. the ell, and draw back on exportation $9\frac{50\frac{3}{4}}{100}$ d.

Ditto, above $1\frac{1}{8}$ ell and under two ells, pay on importation

1 s. $1\frac{4\frac{1}{5}}{100}$ d. the ell; and draw back on exportation $11\frac{61\frac{3}{5}}{100}$ d.

Ditto, of the breadth of two ells, and under three ells, pay on importation

1 s. $3\frac{15\frac{1}{8}}{100}$ d. the ell; and draw back on exportation 1 s. $1\frac{72\frac{7}{8}}{100}$ d.

Ditto, of the breadth of three ells or upwards, pay on importation 1 s. $11\frac{58\frac{7}{8}}{100}$ d. the ell;

and draw back on exportation 1 s. $10\frac{16\frac{3}{8}}{100}$ d.

Hamburgh and silesia-cloth, broad, the hundred ells, containing six

score, pay on importation 2 l. 3 s. $5\frac{67\frac{1}{2}}{100}$ d.

and draw back on exportation 1 l. 18 s.

$\frac{67\frac{1}{2}}{100}$ d. Ditto, narrow, pay on importation 1l. 14s. $9\frac{7\frac{1}{2}}{100}$ d. and draw back on exportation 1l. 10s. $11\frac{7\frac{1}{2}}{100}$ d. Lawns the piece, containing thirteen ells, 1l. 1s. $10\frac{3\frac{1}{2}}{100}$ d. and draw back on exportation 19s. $\frac{1\frac{1}{2}}{100}$ d. Silesia-lawns, the piece, containing between four and eight yards, 2s. 2 $\frac{3\frac{1}{2}}{100}$ d. and draw back on exportation

1s. $11\frac{23\frac{3}{4}}{100}$ d. All linen made in

Germany and Poland, as narrow-silesia, narrow-westphalia, &c. plain napkinning, and all other narrow cloth made in these countries, not otherwise rated, pay, upon importation, the hundred and twenty ells, 17s. $4\frac{6\frac{1}{2}}{100}$ d. and draw back on exportation 15s. $5\frac{8\frac{1}{2}}{100}$ d. And besides the above duties, all linnens, chequered, striped, printed, painted, stained, or dyed (except lawns, striped or chequered linnens, being all white, silesia-neckcloths striped at the ends only, barras or packing canvas, and buckrams) pay on importation, for every 20s. value on oath, 6s. which is returned on exportation.

LINNET, *linaria*, in ornithology, a bird of the size of the goldfinch; the head is small and flatted; the eyes are small, and hazel; the beak is conic, very small, and sharp at the point; the head, neck, and back are variegated with a bright brown and white; the breast and belly are pale, but in the male, especially in the summer, there is a redness on the top of the head and all over the breast. This is a singing bird, and sometimes has young ones four times a year, especially if they are taken from the dam before they are able to fly, which may be done four days after they are hatched. See plate CLIX. fig. 1. which represents the cock and hen, with an egg.

LINSEED, the seed of the plant *linum*. Linseed bruised and steeped in water, gives it very soon a thick mucilaginous nature, and communicates much of its emollient virtues to it. It is anodyne, attemperating, and of great service in suppressions of urine from inflammation and heat; it envelops the acid salts of the urine, and prevents their vellicating and wounding the tender parts; and in some measure supplies the mucus of the bladder, when abraded and worn off. It is to be given in decoction or infusion, on these occasions; the infusion is not to be

made too thick or mucilaginous, because in that case it loads the stomach and breeds flatulencies in the intestines. A slight infusion of linseed, by way of tea, is recommended by many as an excellent pectoral; and the seed is a common and very good ingredient in clysters. Externally, this seed, ground to powder, is an excellent emollient; as is also the strong mucilage, made by boiling the seeds a long time; the oil drawn from it by expression, is of great service in coughs, pleuresies, and many other cases.

LINSPINS, in the military art, small pins of iron, which keep the wheel of a cannon, or waggon, on the axletree; for when the end of the axletree is put thro' the nave, the linspin is put in, to keep the wheel from falling off.

LINSTOCK, in the military art, a wooden staff, about three feet long, upon one end of which is a piece of iron, which divides in two, turning from one another, having each a place to receive match, and a screw to keep it fast: the other end is pointed, and shod with iron, to stick in the ground. It is used by gunners, to fire the guns.

LINT, *linum*, from the flax of which linnen is made. See FLAX and LINNEN.

In surgery, the term lint denotes the scrapings of linnen which is used in dressing wounds, and is made up in various forms, as tents, dossils, pledgets, &c. See the articles TENT, DOSSIL, &c.

LINTEL, in architecture, a piece of timber that lies horizontally over door posts and window-jambs, as well to bear the thickness of the wall over it, as to bind the sides of the wall together.

LINTON, a market-town of Cambridgeshire, situated ten miles south-east of Cambridge.

LINTS, or **LINTZ**, a beautiful city, capital of Upper Austria, with a strong citadel.

LINUM, **FLAX**, in botany, a genus of the pentandria-pentagynia class of plants, the flower of which is infundibuliform, consisting of five oblong petals; its fruit is a globose capsule, divided into ten cells, in each of which is a single acuminate seed. See the articles FLAX and LINSEED.

LION, *leo*, in zoology, the strongest and fiercest of all quadrupeds: it is a species of felis, with an elongated floccose tail, and a mane on the neck; and is larger in size than the biggest mastiff: its head is large, and the breast broad, in proportion

tion to the other parts; the legs are also very thick and strong, and its claws of a surprising length and thickness: the fur of the whole body is of a tawney yellow colour. The lioness is, in all respects, like the lion, except that she wants the mane; but this makes so great a difference in her appearance, that she seems a creature of a different genus. See plate CLIX. fig. 2. which represents a lion, called Marco, in the tower of London; also a lioness, lying upon the ground.

LIONCELLES, in heraldry, a term used for several lions born in the same coat of arms.

LIP, *labium*, or *labrum*, in anatomy, the exterior fleshy covering of the mouth. See the article **MOUTH**.

The lips are two in number, an upper and under. They are composed principally of muscles, and are covered externally with the general integuments, and internally with the membrane of the mouth: under this membrane there is in both lips, a great number of miliary and lenticular glands. The prolabia, when the epidermis is taken off, after macerating a sufficient time in water, are found also to have a multitude of nervous papillæ; and hence it is that they are so extremely sensible. Each of the lips has its peculiar frænulum; the upper one under the nose, and the under one near the roots of the dentes incisores: they are of the utmost service to us in speaking, eating, and drinking.

The lips may be wounded either with sharp or blunt instruments, or with bullets. Wounds of the first sort, whether made lengthwise or transverse, are generally to be cured by the dry suture; the patient, in this case, must carefully avoid both chewing and talking; his diet, therefore, must be entirely spoon-meat. If the wound is very large, it will require the bloody, or true suture. In wounds made by blunt instruments, by falls, or by bullets, the shattered parts should be brought to digestion; and the lips of the wound, after being cleaned, be brought together, either with sticking plasters, or by the suture used for the hare-lip.

The most dreadful disorder in the lips, is the cancer, which is, as in the other parts of the body, of two kinds, *viz.* latent, and ulcerated: by a latent cancer, is here meant a hard, painful and inflammatory tumour in the lip; and the ulcerated cancer is when the tumour degenerates

into a spreading fetid ulcer, discharging an acrimonious offensive matter, which corrodes not only the lips, but every part of the face it touches. This species is generally seated in the lower lip, which it quickly divides, as if it were slit. See a more particular account of the nature and causes of this disorder, under the article **CANCER**.

The cure of a cancer in the lips is to be performed by different methods, according to the particular condition of the disorder: for, 1. When only a small chap or fissure infests the upper part of the lip, like a painful and inflammatory ulcer, the cause of the disorder being external, from cold, or the like, it may then be proper to treat it with honey of roses, balsam of Peru, or saturnine unguent with mercury, and afterwards to cover it with a plate of lead that has been rubbed with mercury; and this continued and renewed till the disorder disappears: in the mean time, a proper regimen and course of medicines ought not to be neglected. The juice of rotten apples, mixed with mercurius dulcis, has also afforded great relief under this disorder. But when neither these, nor any other medicines, are of any service, and the disorder grows worse and worse, the only remedy is to extirpate the cancerous part of the lip, by two or three incisions with a scalpel or lancet, observing to remove some of the sound parts, rather than leave the least bit of the cancer behind; and then you may conjoin the lips of the wound by two needles, as in the hare-lip; or when, the fissure is but small, by the futura nodosa. 2. When the cancer is not yet ulcerated, but infests that part of the lip next the skin, with a very hard and painful tumour, it is the best way (as the application of caustics is generally dangerous in these cancers) to extirpate it by the scalpel, or scissars: the method of amputation for those that are moveable, is to make an incision through the skin with a scalpel, and after freeing the tubercle from its adhesions with the knife or scissars, the wound is then to be healed in the usual manner; but such as are fixed and immoveable, are to be extirpated, together with part of the lip in which they were contained, treating the wound afterwards by suture, as in the hare-lip. But in whatever method you proceed, it will be to no purpose, if the patient does not observe a proper regimen of diet and medicines, with bleeding and lenient purges,

Fig. 1. LINNET, Cock, Hen, and Egg.



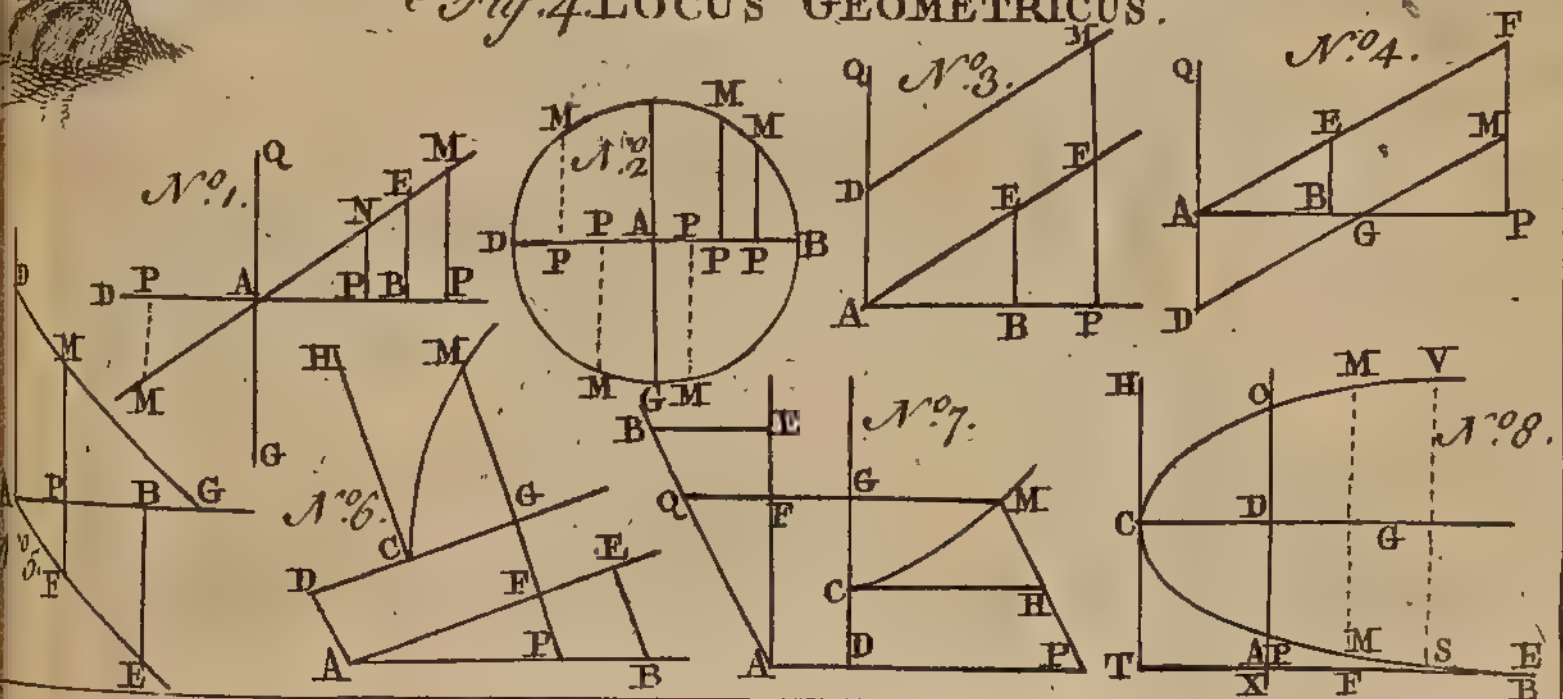
Fig. 2. The LION, & LIONES.



Fig. 3. HARE-LIP.



Fig. 4. LOCUS GEOMETRICUS.



J. Jefferys. sculp.



purges, to prevent a speedy return of the disorder.

Hare-LIP, a disorder in which the upper lip is in a manner slit or divided, so as to resemble the upper lip of a hare, whence the name.

Sometimes the division is so large, that it appears as if part of the lip was wanting; and sometimes again the division is double. A like fissure is also sometimes made in the lower lip by a wound that has been neglected, or improperly treated: this last species of the disorder is termed the spurious hare-lip; the true kind is born with the infant. The less and more equal the fissure of the hare-lip is, it is generally so much the more easily cured. In some infants, the division of the lip is so large and irregular, that there can be but little hopes of a cure, which may, however, be easily performed on the very same lip, when adult. Sometimes too we meet with a tooth projecting forward into the fissure; in this case it cannot be cured without first taking out the tooth. In a recent hare-lip, or one made by a wound, the cure is to be performed by the knotted suture. See the articles **SUTURE** and **WOUND**.

In curing the hare-lip, where part of the lip is wanting, no attempt can be made to supply what is deficient, but only to unite those parts which are divided, by taking off the skin from the edges of the fissure, and then causing them to unite and grow together, by passing through them two or three needles, made of gold or silver, pointed with steel, from the right to the left, beginning with the upper part of the fissure, and inserting them at about a straw's breadth from each other: the surgeon having thus entered the needles, and cleansed the bleeding lips with a sponge, he takes a piece of strong wax thread or silk, and fastening it about one end of the needle, he winds it over the other end, and back again, as in plate **CLIX.** fig. 3. and afterwards secures it by a knot: by this means the edges of the lips are brought close together, and the upper part or surface kept smooth and even. To heal the wound internally, it is dressed with soft lint dipped in honey of roses, and put between the gums and lip; but this practice can only be followed with adults: the external part of the wound is at the same time dressed with balsam of Peru, or some other vulnerary unguent, covered with lint and compress, and over that a stick-

ing plaster with four heads, two of which are fastened on the left side of the lip, and two upon the right, and the whole secured by a sling or fillet, whose extremities may be fastened about the head, either by a knot or pins. But it must here be observed, that when the fissure appears large and deep, so that the two parts of the lip cannot be easily joined, it will be necessary, before the above operation, to divide the frænulum of the upper lip from the gum with a pair of scissars, but without wounding the gum, or uncovering the jaw. Though the hæmorrhage is often very plentiful in performing these operations on young infants, yet it is not dangerous, since it prevents an inflammation, and generally ceases after tying the bandages.

The dressings ought not to be moved before the third day, unless some accident makes it necessary; and then it must be done with great caution, to avoid separating the parts in contact. If the lips of the wound appear conjoined, three or four days after the operation, you may then venture to draw out the middle needle, when there are three, or the upper one, when there are only two; and two or three days after draw out the other; the cure must be completed by dressing every day, as at first.

LIPOTHYMIA, **FAINTING**, in medicine, may arise from several causes, as too violent exercises, suppression of the menses, or other accustomed evacuations, &c.

A lipothymy is often symptomatic, accompanying the scurvy, malignant fevers, and the like disorders; which being cured, the disposition to faintness ceases of course.

As to the cure of an idiopathic lipothymy, proceeding from the sight of blood, wounds, ulcers, or any chirurgical operation, nothing more is necessary than to change the room, and go into fresh air; and if this cannot be done, the smell of hungary water, volatile spirits, wine, and strong vinegar, sprinkling the face with cold water, or a draught of generous wine, will recover the drooping spirits of the patient. When a person to be let blood is afraid of fainting, he should be laid upon a bed.

In more grievous fainting fits, where gentle cordials are of little use, the stronger sort must be applied, as spirit of sal ammoniac, to the nostrils, temples, and pulses, with strong frictions; or forty or

fifty drops of volatile spirits may be given internally, to which may be added cinnamon-water, orange-flower-water, or the like; nor forgetting a draught of generous wine, with vellications and frictions of the extremities, nose, ears, head, hair, &c. till the person recovers. When the patient is hysteric, none but fetid things should be applied to the nose; such are castor, asa foetida, burnt feathers, leather, horn, and the like.

If the lipothymy proceeds from excessive hæmorrhages, they must be stopped as soon as possible; and the patient must take broths, jellies, spirituous liquors, and generous wine, till quite recovered; which remedies are also to be used, when it proceeds from diseases, loss of strength, or a defect of spirits and good juices.

LIPPIA, in botany, a genus of the didynamia angiospermia class of plants, the flower of which is monopetalous and ringent, with a quadrifid limb; the fruit is a bivalve unilocular capsule, containing two seeds, which grow together.

LIQUIDAMBER, in botany, a genus of the monoecia-polyandria class of plants, having no corolla; the stamina are very numerous short filaments; the calyces of the female flower are collected into a kind of globe, each consisting of four leaves; there is no corolla; the styles are two; the fruit is composed of a number of oblong, bivalve unilocular capsules, formed into a globular body; the seeds are numerous and oblong.

This tree, which grows to a vast size, is a native of America, where a very fragrant resin is obtained from it in great abundance, called liquidamber, which heats and moistens, resolves and opens obstructions, and is an emollient and ripener. Its principal use is in obstructions and hardnesses of the womb, in hard tumours, &c.

LIQUOR. See **DRINK**, **FLUID**, &c.

Medicated liquors are directed by Boerhaave, to be made thus: take a dram of any elæosaccharum, and two drams of the medicated salt of Tachenius; grind them together in a glass-mortar, till they become thoroughly mixed: then add six ounces of the cohobated distilled water of the same plant from whence the elæosaccharum was made; and thus, in a small compass, the virtue of a plant may be collected together for medicinal use, and according to its own nature in the body. The dose of these medicated liquors is principally determined from the power of

the oil employed in them; the time for giving them, is chiefly when the stomach is empty, and according to the nature of the distemper; for example, a tertian fever, very cold in the beginning, is to be cured after this manner.

LIQUOR MINERALIS ANODYNUS, is a name given by Hoffman to a liquor of his invention, famous at this time in Germany, and supposed by Burggrave to be made in this manner: take oil of vitriol, and indian nitre, of each four ounces: distil the spirit gradually from this, by a retort: pour two ounces of the spirit cautiously and successively, into fifteen ounces of spirit of wine, highly rectified; distil this, and there comes over a very fragrant spirit: this is to be again distilled, to render it perfectly pure, adding first to it a small quantity of oil of cloves, and a quantity of water, equal to that of the spirit; after this, as soon as the watery vapours begin to rise, the whole process is to be stopped, and the spirit kept alone in a bottle, well corked. This has great virtues as an anodyne, diaphoretic, antiseptic, and carminative. It is not certain that this is the same with Hoffman's, that author never having published his manner of making it; but it appears the same to the smell and taste, and has the same virtues.

LIQUORICE, in the materia medica, the root of a plant called by botanists glycyrrhiza. See **GLYCYRRHIZA**.

It is an excellent medicine in coughs, and all disorders of the breast and lungs: it obtunds the sharpness of acrid and salt humours; and is also recommended against disorders of the kidneys and bladder. It is an ingredient in almost all decoctions and ptisans, in which it is esteemed for obtunding the acrimony, and drowning the worse flavour of the other ingredients: and it is also used in most syrups and electuaries. The only simple preparations of it in use, is its inspissated juice, commonly known by the name of spanish juice of liquorice, as being brought originally from Spain; this hath the same virtues as the root itself. It is to be chosen firm, but not tough, hard, and, when broken, of a fine shining surface; such as melts in the mouth without leaving any harsh or gritty particles in the teeth, and does not taste of burning. It is made in the same manner as the other extracts. See the article **EXTRACT**.

LIRIODENDRUM, the **TULIP-TREE**, in botany, a genus of the polyandria-polygynia

nia class of plants, the flower of which consists of six or nine petals, which are oblong, erect, obtuse, narrowest at the base, and equal: there is no pericarpium, the seeds being closely arranged together in an imbricated manner; they are numerous, and terminate in a squama of a lanceolated form.

LIS, a river which rises at Lisburg in Artois, and passing through part of the Netherlands, unites its waters with the Scheld at Ghent.

LISBON, the capital of Portugal, situated on the north bank of the Tagus, about ten miles from its mouth, and eighty miles west of the frontiers of Spain: west long. $9^{\circ} 25'$, north lat. $38^{\circ} 25'$. It is about six miles long, winding with the river, from whence it rises with an easy ascent, and is computed to contain about 30,000 houses, 200,000 inhabitants, forty parish churches, and forty convents of both sexes.

LISIEUX, a large city and bishop's see of France, in the province of Normandy: east longitude $16'$, and north latitude $40^{\circ} 14'$.

LISLE, or **RYssel**, a large and populous city, the capital of French Flanders, situated on the river Deule, twelve miles west of Tournay: east long. 3° , and north lat. $50^{\circ} 42'$.

LIST, in commerce, the bordure of cloth, or of a stuff; serving not only to shew their quality, but to preserve them from being torn in the operations of fulling, dying, &c.

List is used on various occasions; but chiefly by gardeners, for securing their wall-trees.

LIST, in architecture, a little square moulding, otherwise called a fillet, listel, &c. See **FILLET** and **MOULDING**.

LITANY, a solemn form of supplication to God, in which the priest utters some things fit to be prayed for, and the people join in their intercession, saying, *we beseech thee to hear us, good Lord*, &c.

At first, the use of litanies was not fixed to any stated time, but were only employed as exigencies required. They were observed, in imitation of the Ninevites, with ardent supplications and fastings, to avert the threatening judgments of fire, earthquakes, inundations, or hostile invasions. About the year 400, litanies began to be used in processions, the people walking barefoot, and repeating them with great devotion; and it is pretended, that by this means, several coun-

tries were delivered from great calamities. The days on which these were used, were called rogation days: these were appointed by the canons of different councils, till it was decreed by the council of Toledo, that they should be used every month throughout the year; and thus by degrees they came to be used weekly on Wednesdays and Fridays, the antient stationary days for fasting. To these days the rubric of our church has added Sundays, as being the greatest days for assembling at divine service. Before the last review of the Common Prayer, the litany was a distinct service by itself, and used sometime after the morning prayer was over; at present it is made one office with the morning service, being ordered to be read after the third collect for grace, instead of the intercessional prayers in the daily service.

LITCHFIELD, a city of Staffordshire, one hundred miles north-west of London, and twelve south-east of Stafford. This city and Coventry have one bishop between them: it sends two members to parliament.

LITERATI, in general, denotes men of learning; but is more particularly used by the Chinese, for such persons as are able to read and write their language. See the article **CHINESE**.

LITHANTHRAX, **PIT-COAL**, in natural-history, a genus of fossils, defined to be solid, dry, opaque, inflammable substances, found in large strata, splitting horizontally more easily than in any other direction, of a glossy hue, soft and friable, not fusible, but easily inflammable, and leaving a large residuum of ashes.

Of this genus there are three species,

1. The hard, dusky, black coal, known in London by the name of scotch coal.

2. The hard, glossy, black coal, known by the same name; though both these species are found also in England, particularly about Limington and in Wales.

3. The friable, glossy, black coal, called Newcastle coal, as being chiefly dug about that town.

LITHARGE, is properly a recement of lead, or lead vitrified, either alone, or with a mixture of copper. It is of two kinds, differing in colour, though in no other quality; the one of these is called litharge of gold, and the other litharge of silver: these are collected from the furnaces where silver is separated from lead, or from those where gold and silver are purified by means of that metal; but

the litharge sold in the shops is produced in the copper-works, in which lead is used either to purify the metal, or to separate the silver from it; this is of a redder or yellower colour, as the fire has been more or less strong, and is always composed of a multitude of thin flakes. Litharge is soluble in oil, and all other unctuous substances; and thus dissolved, it makes the basis of a great part of the ointments and plasters of the shops. It is drying, abstergent, and slightly astringent, and hence it is of great use in cleansing ulcers, and disposing them to incarnate.

LITHIDIA, in natural history, the name of a large class of fossils, including the flint and pebble kinds. See the articles **FLINT** and **PEBBLE**.

The lithidia are defined to be stones of a debased crystalline matter, covered by, and surrounded with, an opaque crust, and frequently of great beauty, and considerable brightness within, tho' of but a slight degree of transparency, approaching to the nature of the semi-pellucid gems, and like them found in not very large masses. See the article **GEM**.

The bodies of this class are divided into two general orders, and under those into three genera. The first order of the lithidia contains those composed of a crystalline matter, but slightly debased, and that ever by one and the same earth, tho' diffused thro' them in different degrees, and always free from veins. The second order is of those of a more debased crystalline matter, blended with different portions of different coloured earths. Of the first of these orders there is only one genus, which is that of the common flint. Of the second order there are two genera. 1. The homochroa, which are of one plain and simple colour; and, 2. The calculi, which are composed of crusts of several different colours. Both these genera are comprised under the common English name of pebbles.

LITHOCOLLA, a cement used by lapidaries for fastening precious stones together. See the article **CÆMENT**.

LITHOGENESIA, a term used by some authors, for the formation of stones. See the article **STONE**.

Henkel has thrown together some very ingenious thoughts on this abstruse subject, in a treatise published in the year 1734, where he builds no opinion on any other basis than that of facts, observations of nature, and experiments. He supposes that the earth was at first every

where soft on the surface, and that this soft matter, by degrees, hardened, and formed stones of several kinds. He seems to imagine, that the surface of the earth was a second time all reduced to this soft state by the universal deluge at the time of Noah, and that this matter, afterwards hardening into stones of various kinds, included the shells of sea-fishes, and other animal-remains of the produce of the seas, in flints, in lime-stone, or in whatever other substance the matter among which they lay chanced to harden. Thus may the sea-shells, found singly in the middle of hard flints, or lodged in vast numbers in the strata of earth, limestone, or marble, be accounted for. Waters of other kinds we are very sensible may carry particles of stony matter, and lodge them so in other bodies, as to form complete, hard and solid stones: this is frequently done at this day in the common petrifications of wood, and in the stones generated in the bladders of animals. If this be allowed a property common to several fluids, and to water in several states, there is no reason why it should be denied to have existed in that of the universal deluge; and if that be acknowledged to have had a power of forming stones of various kinds, there is no wonder that stones of various kinds should be found in the strata, and on the surface of this earth, which was all covered by that water; or that the stones formed in that immense body of water should shew, as they do in many instances, the several crusts or coats laid one upon another, by the successive applications of the matter of which they were formed. If we consider also the immense quantity of animal and vegetable-bodies; some entire, others only separated into parts, which must have been mixed with, floating among, or lying upon the bottom of this immense bed of water; and that stones were continually forming out of this water at this time; we cannot wonder that these stones should take up these parts of plants or animals, or concrete about them, or that we should find shells and teeth of fishes, or pieces of wood, or leaves of plants preserved in them. Nor is water alone the agent that may have made these changes in the once soft parts of the earth's surface; we can by fire reduce the poorest earths into a sort of glass, a hard transparent body, not a little resembling the nature of flint or the other semi-

semi-pellucid stones. Fire has a power to do great things in the bowels of the earth, and the way to learn what changes it may there make in stones, is to try its effects upon the several different kinds of stones and earths here. By experiments of this kind we learn, that of the several species of stones in their present state, some are reduced to a friable mass, and finally to powder, by the force of fire, others are hardened by it, others are melted, and become a kind of glass: and by experiments, on the other fossile-substances, it appears, that the original matter of all stones has been earth, either of the nature of chalk, marle, or clay; and that many of them have been greatly altered by receiving metallic or other mineral matter into their earthy matter, at the time of their formation; and all seem to have owed their change into their hard state, either to fire alone, or to saline oily, metallic, or saline sulphureous matters, either conjunctly with the force of this agent, or alone.

Those stones, which were formed in their present state, immediately out of fluids, have been produced either by congelation, a rude coalition, or crystalization; and that all the gems have been once fluid, is plain from their imperfections in certain instances, as from their containing grains of sand, or the like extraneous substances, firmly embodied in them. If these, the hardest of all stones, have been once fluid, there is no reason to dispute, but that all the other kinds may have been so, which are less hard and less perfect.

LITHOMANTIA, *Λιθομαντία*, in antiquity, a species of divination performed with stones. Sometimes the stone, called siderites, was used: this they washed in spring-water, in the night, by candle-light; the person that consulted it was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divers prayers, and placed certain characters in an appointed order; and then the stone moved of itself, and in a soft, gentle, murmur, (or as some say) in a voice like that of a child, returned an answer. By a stone of this nature, Helena is reported to have foretold the destruction of Troy.

LITHOMARGA, *Stone marle*, a name given by some authors to a sparry substance highly debased by earth, which is found in great plenty in the caves of the Hart's forest in Germany, and used there

in medicine, under the name of the unicorn fossile, or fossile unicorn's horn, from its sometimes emulating that figure.

See the articles **MARLE** and **UNICORNU**. **LITHONTRIPTICS**, medicines which either break or are supposed to have the virtue of breaking stones in the urinary passages. Of this kind is Mrs. Stephen's medicine, which is a composition of soap and lime made of different shells, which every body knows to be highly caustic, and is therefore condemned by Dr. Mead; since its corrosive quality must be injurious to the bladder: however, under proper management, he thinks it may be of some service in expelling gravel by the urinary passages; tho' it will never be able to break calculi of the hardness of stone. Dr. Whytt, of Edinburgh, after considering the inconveniencies and sometimes mischiefs of this celebrated specific, resolved to omit the soap, and try what virtues lime-water would have without it, in dissolving the calculus; and found that lime-water made by pouring seven or eight pints of water on one pound of fresh calcined oyster or cockle-shells, possessed a greater power of dissolving the calculus, than that of stone-lime; and by giving four pints of it a day to adults, and to children in proportion, he found that it produced the most happy effects.

LITHOPHYTA, in botany, a subdivision of the cryptogamia class of plants, so called from their approaching to a stony hardness, comprehending the isis, spongia, millepora, tubipora, &c.

LITHOSPERMUM, **GROMWELL**, in botany, a genus of the pentandria-monogynia class of plants, the corolla of which consists of a single petal of the length of the cup: the tube is cylindric, the limb semiquinquefid, obtuse and erect: there is no pericarpium, but the cup becomes patulous and long, containing four broad, oval, acuminate and hard seeds.

The seeds of this plant, being the only parts used in medicine, are accounted diuretic. Emulsions are made of them with dog's grass-water.

LITHOSTROTION, in natural history, the name of a species of fossile-coral, composed of a great number of long and slender columns, sometimes round, sometimes angular, jointed nicely to one another, and of a starry or radiated surface at their tops. These are found in considerable quantities in the northern and western

western parts of this kingdom, sometimes in single, sometimes in complex specimens. See the article CORAL.

LITHOTOMY, in surgery, cutting for the stone. See the article STONE.

Mr. Sharp lays down the following method of searching for the stone. The patient being laid on an horizontal table with his thighs elevated, and a little extended, pass the sound, or catheter, with the concave part towards you, till it meets with some resistance in the perinæum a little above the anus; then turning it without much force, push it gently on into the bladder, and if it meets with an obstruction at the neck, raise its extremity upwards, by inclining the handle of it towards you; and if it does not then slip in, withdraw it a quarter of an inch, and introducing your fore-finger into the rectum, lift it up, and it will seldom fail to enter. Though, upon searching, the surgeon may be assured of a stone in the bladder, yet he is not without farther inquiry to operate immediately; since there are some obstacles that forbid the operation, either absolutely, or only for a certain time. Among these, that of the greatest consequence is the gravel or stone in the kidneys, which is known by the pain in the loins, vomiting, retraction of the testicles, numbness of the thighs, and often by matter which the inflammation produces in the kidneys. Difference of age make an extreme difference in danger, infants and young people almost always recovering; but still the operation is adviseable in those advanced in years, though it is not attended with near the same success. Before the operation is performed, it is proper to prepare the patient with a gentle purge the preceding day, and a clyster early in the morning, which will be of great service in cooling the body and making the operation less dangerous, where the rectum is liable to be wounded when full.

The most convenient time for the operation of lithotomy is spring or autumn, though when the patient is in exquisite torment, or his life in danger, the present opportunity should be embraced. Lithotomy is of two kinds: that made into the bladder is termed cystotomy; but when the stone is in the kidneys, which very rarely happens, the operation is termed nephrotomy.

With respect to the several methods of performing lithotomy for the stone in the

bladder, they, according to Heister, are four: the first, and most antient, is the apparatus minor, called likewise the celsian or guidonian method: the second the apparatus magnus, or Marianus's method; the latter being termed the new, and the former the old method: the third is the apparatus altus, or hypograftic section; wherein the incision is made at the lower part of the abdomen in the anterior side of the bladder, immediately above the os pubis; whereas in the rest it is made in the perinæum, between the anus and the scrotum: the fourth, and most modern method, was invented toward the end of the last century, and is termed the lateral operation. 1. The first method is now entirely laid aside, though Heister thinks it practicable on boys under fourteen: the wound of the bladder in this operation, says Sharp, is made in the same place as is now practised in the lateral method; but its being impracticable on some subjects, and uncertain in all others, has made it to be universally exploded.

2. In performing lithotomy by the apparatus major, Mr. Sharp's directions for the situation of the patient are thus. Having laid the patient on a square horizontal table, three feet four inches high, with a pillow under his head, let his legs and thighs be bent, and his heels made to approach his buttocks by tying his hands to the soles of his feet with a couple of strong ligatures; and to secure him more effectually from struggling, pass a double ligature under one of his hams, and carry the four strings round his neck to the other ham: then passing the loop underneath, make a knot by threading one of the single ends through the loop; and thus the thighs are to be widened from each other, and firmly supported by proper persons.

The patient thus situated, Heister directs the operation as follows: the operator, dipping the beak of a sizeable and grooved steel catheter A (plate CLX. fig. 1.) in oil, he conveys it thro' the urethra into the bladder, and being assured there is a stone, turns the crooked part of the catheter in the bladder and urethra towards the left side of the perinæum, but the handle and penis which contains it, towards the right inguen, then delivers it to the assistant, who holds up the scrotum in the other hand; for the crooked convex part of the catheter thus elevated in the perinæum, renders

Fig. 1. Instruments used in LITHOTOMY.

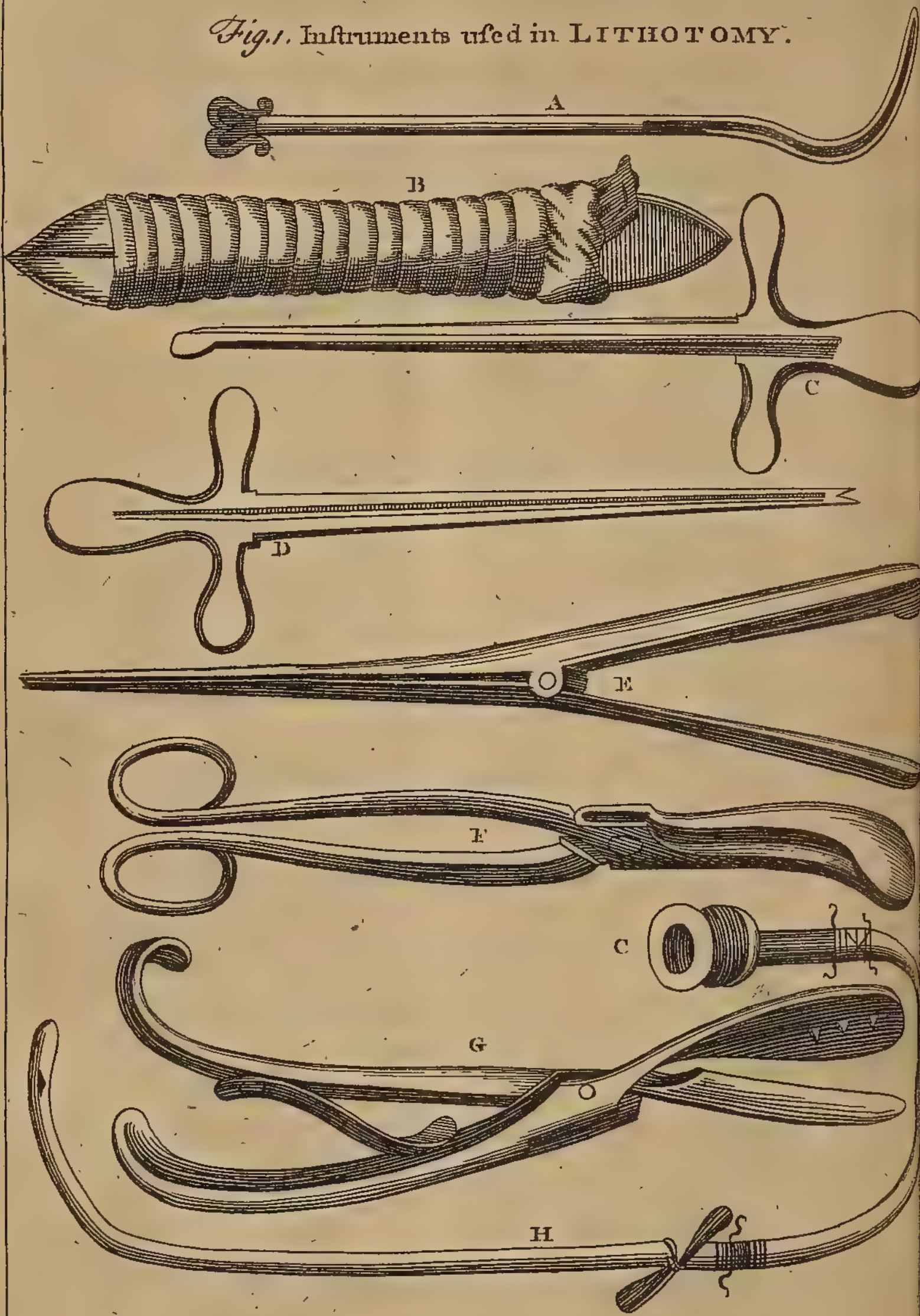
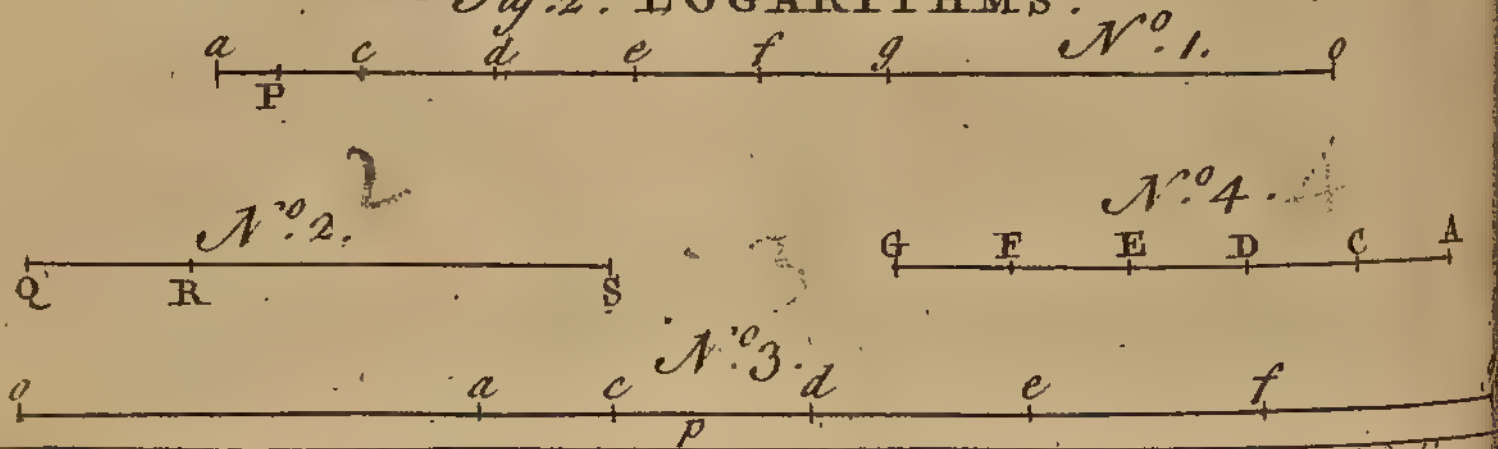


Fig. 2. LOGARITHMS.



renders that part of the urethra which is to be divided, sufficiently perceptible both to the sight and touch. He next lays hold of the integuments of the perinæum with the fingers of his left hand, holding in his right the incision-knife, B, wrapped in linen, as he would do a pen for writing: with this he makes a longitudinal incision downwards, about the middle of the left side of the perinæum near the suture, through the fat; then he again feels for the catheter, and afterwards divides the urethra in a direct line downward, so that the end of the knife may pass into the groove of the catheter. After a proper incision, the surgeon parts with his knife, inserting in the groove of the catheter, if an assistant holds it, the nail of his finger or thumb: then he takes a male conductor, C, dips it in warm oil, and having passed it thro' the groove of the catheter and neck of the bladder into the bladder itself, extracts the catheter. The male conductor being thus passed, a female conductor, D, is introduced upon it, in such a manner as the latter receives the prominent back of the former in its groove, and conveys it safely into the bladder thro' its neck. After this the two conductors are gently separated by their handles, and then a straight forcep, E, dipt in oil and shut very close, is carefully conveyed into the bladder between the conductors. The forceps, after it is introduced, and the conductors withdrawn, must be opened several times to dilate the wound, and then shut to search for the stone: when the stone is found, they must be opened with both hands, in such a manner that one jaw, if possible, may lay hold under the stone, and the other above it. When the stone is thus intercepted, the forceps, by a gentle motion from side to side, must be brought towards the rectum, and the stone extracted downwards, because the parts dilate and yield more easily that way, while upwards they meet with a resistance from the os pubis: but if it lies concealed in any part of the bladder, and cannot be laid hold of by the forceps, the operator must pass the two first fingers of his hand in the anus, elevate the stone, and force it into them. If it is situated in the upper part of the bladder, behind the ossa pubis, the inferior part of the abdomen must be pressed downwards by the hand, that it may commodiously be taken hold of, and drawn out by the straight or a crooked forceps; and if it is lodged on

either side, the crooked instrument F is most convenient.

When the stone is too large to be extracted whole, it must be broken by a forceps, G, with teeth, and the fragments to be drawn out one after another. Lastly, if the stone is too large and too hard to be either extracted or broken, a prudent surgeon will desist, and heal the wound or leave a fistula for the discharge of the urine. The stone being thus extracted, and the bladder cleared, the wound is cleansed with a sponge, the ligatures untied, the patient put to bed, and the wound now dressed with dossils of scraped lint: if the hæmorrhage be too profuse, it may be stopped by pledgets of lint dipt in a proper styptic, and the arteries compressed with the fingers till it stops. These must be covered with a linen bolster, and a large square compress without a plaster, securing the whole with the T bandage, or that with four heads; and if they are ineffectual, the artery must be tied up with a crooked needle and thread. See HÆMORRHAGE.

After dressing, the patient must be supplied with plenty of ptisan, barley-water, or a strengthening and composing emulsion; his diet should be the same as for people in fevers, or after great wounds. See the articles FEVER and WOUND.

3. The apparatus altus, or high operation, is performed as follows. The patient being duly prepared, and laid in a proper situation, a hollow silver-catheter, with a flexible leathern tube H (*ibid.*) at the end of it is to be introduced into the bladder: to the tube must be fitted a large syringe, for the injecting of such warm water, barley-water, or milk, as the patient can bear. When this is done, the catheter is extracted: then while an assistant introduces his two fore-fingers into the anus to elevate the stone and bladder, the operator makes an incision in a right line through the skin, fat, and abdominal muscles, immediately above the ossa pubis. The external wound should be three fingers-breadth long in children, and four in adults; then introducing the left index, the surgeon feels for the liquor that distends the bladder, and then makes an incision into the bladder immediately above the juncture of the ossa pubis: after which he passes a small knife into the body of the bladder, so as to make a small wound with the point only; through this aperture he passes a crooked or straight knife, armed with

with a button, whereby he enlarges the wound upwards the breadth of one or two fingers. He then introduces his left index to draw the upper part of the bladder towards the navel, and then enlarges the wound downwards. Immediately after, he introduces the fore-finger of the other hand, and examines the size and situation of the stone, and accordingly he enlarges the wound either upwards or downwards, in order to extract it. And when the stone is extracted, and nothing left, the wound is dressed, and the patient treated much in the same manner as in the former case.

4. The fourth method, which is called the lateral operation, is performed by Cheselden thus: every thing being properly prepared, he introduces a catheter, and afterwards makes an incision of a proper length, beginning where they end in the apparatus major, and continuing it downwards between the accelerator urinæ, and erector penis, on the left side of intestinum rectum; and directing his knife to the posterior part of the catheter, through the inferior and lateral part of the bladder, behind the prostate gland, and above the seminal vesicles, he then continues it forwards through the sphincter of the bladder, and left side of the prostate glands into the membranous part of the urethra even to its bulb, which preserves the rectum better than the lateral method.

Among Cheselden's emendations, Douglas enumerates these. 1. If he finds the patient's pulse low after the operation, he applies blisters to the arms, which effectually raise his spirits. 2. If the wound grows callous, he lays on a piece of blister-plaster to erode it, by which new flesh pululates, and the wound unites. 3. If the wound be putrid, he mixes a little verdigrease with some digestive ointment.

Women are less subject to the stone in the bladder than men, and their urinary passages are more short and lax, so that in general the stone, being but small, discharges itself with the urine, and when it happens to increase in the bladder, we have instances of its coming away spontaneously. Douglas proposes to extract a small stone in a woman, by dilating the urethra with a tent of gentian-root, or prepared sponge; but when the stone is large, he approves of the high operation, distending the bladder with warm water, and compress-

sing the urethra by an assistant's finger in the vagina, and then making an incision into the bladder immediately above the os pubis. This, Heister says, is a very proper method, when the stone is very large, and the patient young and healthy; but Morand, when the stone is small, prefers the apparatus major.

Upon the whole, lithotomy appears to be a dangerous and precarious operation, nor can one method alone be depended on; but the surgeon must be determined in the choice, by the particular circumstances of the case.

Nephrotomy, the second species of lithotomy, is by most writers on the subject thought impracticable, who therefore absolutely reject it; tho' we have many instances of persons, who have been cured of wounds of the back penetrating to the kidneys. Heister mentions one cure of this kind performed by himself. Wounds, therefore, of the kidneys, especially those inflicted on the back, without penetrating into the cavity of the abdomen, he says, are often curable. And though Hippocrates prohibits his pupils from practising lithotomy, yet in treating of disorders in the kidneys, in his work De Intern. Affect. he directs to make an incision near the kidneys when it is tumefied and elevated, and after extracting the pus, to discharge the gravel by diuretics; for this opening may preserve the patient, who must otherwise die: and again, he says, when the kidney, being suppurated, tumifies near the spine, a deep incision should be made upon the tumour near the kidney, or into the kidney itself. Hence it is manifest, that a wound in these parts did not appear so formidable to him. Rousset, Riolanus, and others, think nephrotomy may be practised with success, if the opening is made where the stone is perceptible, and neither the emulgent artery, vein, nor ureter wounded, nor the cavity of the abdomen penetrated. But beyond all dispute it must be reasonable, when nature points out the place by a tumour or abscess in the loins, proceeding from a stone in the kidneys.

LITHOXYLUM, in botany, a term used by Linnæus, to express a heterogeneous substance on sea-plants, which has fructifications in impressed points.

LITHOZUGIA, in natural history, a genus of fossils, of the class of the scrup, composed of a simply stony matter, making

ing a kind of cement, and holding firmly together small pebbles, &c. embodied in it. See the article SCRUPI.

There are two kinds of the lithozugia.

1. That of a crystalline basis and purer texture, approaching to the nature of flint, called by the english lapidaries the pudding-stone: of this kind are reckoned four species; the yellowish white lithozugium, the greyish white lithozugium, the red lithozugium, and the brownish lithozugium, all filled with pebbles. 2. The lithozugia of a coarser texture, approaching to the nature of quarry-stone: of this kind there are also reckoned four species, *viz.* the fresh-coloured lithozugium, filled with reddish, impure, crystalline nodules; the bluish, glittering lithozugium, filled with white, impure, crystalline nodules; the whitish, green, elegant lithozugium, filled with crystalline nodules; and the friable, pale, red lithozugium, variegated with white veins and red nodules.

LITHUANIA, a province of Poland, bounded by Samogitia, Livonia, and part of Russia, on the north; by another part of Russia, on the east; by Volhinia and Polesia, on the south; and by Prussia and Polachia on the west.

LITURGY, *λειτουργια*, a name given to those set forms of prayer which have been generally used in the christian church. Of these there are not a few ascribed to the apostles and fathers, but they are almost universally allowed to be spurious.

The modern liturgies are diversified according to the diversity of nations professing the christian religion. Of these there are the armenian liturgy, composed by one of their patriarchs, named John; that of the cophti or christians of Egypt, written in the cophtic or egyptian language: the æthiopian liturgy, written in the old æthiopic tongue, said to be written by Dioscorus, patriarch of Alexandria; the Greeks have four liturgies, *viz.* those of St. James, St. Mark, St. John Chrysostom, and St. Basil; but they ordinarily read only the latter, the liturgy of St. James being read only at Jerusalem, and that of St. Mark only at Alexandria: the syriac liturgies are much more numerous than the Greek; for father Simon tells us, that the jacobites reckon up forty different liturgies, all under different names. The missal of the Maronites contains twelve liturgies, under the names of St. Xystus, pope; St. John Chrysostom; St. John

the evangelist; St. Peter, the apostle; St. Dionysius; St. Cyril; Matthew, the pastor; John, patriarch; St. Euthathius; St. Maruta; St. James, the apostle; St. Mark, the evangelist; and a second of St. Peter: and the Nestorians have three liturgies, that of the twelve apostles, that of Theodosius, surnamed the interpreter, and a third under the name of St. Nestorius.

The liturgy of the church of England was composed in the year 1547, since which time it has undergone several alterations, the last of which was in the year 1661, and of this liturgy Dr. Comber gives the following character. "No church was ever blessed with so comprehensive, so exact, and so inoffensive a liturgy as ours: which is so judiciously contrived, that the whole may exercise at once their knowledge and devotion; and yet so plain, that the most ignorant may pray with understanding; so full, that nothing is omitted, which ought to be asked in public; and so particular, that it compriseth most things which we would ask in private; and yet so short, as not to tire any that have true devotion. Its doctrine is pure and primitive; its ceremonies so few and innocent, that most of the christian world agree in them: its method is exact and natural, its language significant and perspicuous, most of the words and phrases being taken out of the holy scripture, and the rest are the expressions of the first and purest ages." — And in the opinion of the most impartial and excellent Grotius, (who was no member of, nor had any obligation to, this church) "the english liturgy comes so near the primitive pattern, that none of the reformed churches can compare with it." Again, he says, "In the prayers, a scholar can discern close logic, pleasing rhetoric, pure divinity, and the very marrow of the antient doctrine and discipline; and yet all made so familiar, that the unlearned may safely say, Amen."

LITUUS, in roman antiquity, a short straight rod, only bending a little at one end, used by the augurs. See AUGUR. The appellation lituus is also given to a musical instrument of the wind kind, used in the roman armies; probably from its resemblance to the sacred rod of the augurs.

LIVADIA, the capital of a province of

European Turkey, the antient Achaia, situated on the north side of the gulph of Lepanto: east long. $23^{\circ} 15'$, north lat. $37^{\circ} 30'$.

LIVER, *hepar*, in anatomy, a very large viscus, of a red colour, situated in the right hypochondrium, and serving for the secretion of the bile or gall. See the article **BILE**.

Its figure is irregular; the upper surface being convex, smooth, and equal; the lower, hollow, and unequal. There is also a remarkable eminence called the porta, just where the vena portæ enters it.

In the liver we are also to observe the capsule of Glissonius, its discoverer; which includes the branches of the vena portæ, and the biliary ducts, as they approach the liver, as well as within it.

The vessels of the liver are very numerous; receiving arteries from the coeliac, cystics, diaphragmatics, &c. veins, from the vena portæ, vena cava, and diaphragmatic vein; and nerves from the plexus hepaticus of the intercostals. See the articles **ARTERY**, **VEIN**, and **NERVE**.

The biliary vessels are the ductus choledocus communis, which opens obliquely into the duodenum; the ductus cysticus, which runs from the gall-bladder to the common duct; and the ductus hepaticus, which runs from the liver to the common duct; and the branches of this distributed through the liver, make what are called pori biliarii. See the articles **DUCT**, **GALL-BLADDER**, &c.

The lymphatic vessels of the liver are to be demonstrated either by a ligature of the vena portæ in living animals, or by inflation into the artery, or hepatic duct, in dead ones. To these vessels we may add the canalis venosus, and the great sinus of the vena portæ in the foetus. See the article **FOETUS**.

The substance of the liver was, by the antients, supposed to be formed merely of blood, concreted into a firm mass: Malpighi, and many of the later writers, have determined it to be glandulous; and Ruyfch makes it vasculous, declaring it to be formed of a congeries of very minute vessels.

Having already given the external figure of the liver in grown persons, under the article **INTESTINES**, we shall here give that of a new-born foetus, whereby the difference between them will be the more readily apprehended. A A A A (plate CLXI. fig. 1.) represents the circumfe-

rence of the liver; B B B B, the lower part of the liver, in which there are several irregularities; C, the gall-bladder; D, the umbilical vein, running with a single trunk from the navel to the liver; E E E, the sinuses of the vena portæ, into which alone the umbilical vein inserts itself, with a single trunk; F, the trunk of the vena portæ cut off; G G G G, the principal branches of the sinus of the vena portæ distributed through the liver, which become conspicuous when a small part of the superficies of the liver is abraded off; H, the trunk of the vena cava; I, I, the canalis venosus, or ductus venosus, arising from the sinus of the vena portæ, over-against the ingress of the umbilical vein, and inserting itself into the vena cava: this, in the uterus, carries a great part, and probably the greater part of the blood, carried through the umbilical vein to the liver of the foetus, by a large passage to the vena cava and the heart; but this, after the birth of the foetus, gradually grows narrower and closes; K, the entrance of the umbilical vein into the sinus of the vena portæ.

To this description of the external part of the liver, it may not be improper to add that of its blood-vessels, together with their numerous ramifications, freed from the parenchymatous substance. Fig. 2. *ibid.* represents the under side of these vessels; A being that part of the liver which lies next to the back; B, its right side; C, its anterior edge. D, its left side; E, the vena cava, where it passes through the diaphragm; E 1, E 2, E 3, its three principal branches distributed almost through the whole liver; F, the vena portæ turned upwards, that other vessels may be more easily seen; F 1, F 2, F 3, F 4, four branches of the vena portæ distributed to several quarters of the flat part of the liver, but the fifth branch is not observed on this side; G, the gall-bladder; H, H, the vena umbilicalis become a ligament; I, the ductus communis choledochus; K, the canalis venosus, now performing the office of a ligament; L, the trunk of the vena cava descendens; a, a small portion of the membrane investing the liver; b, that part of the diaphragm which surrounds the vena cava; c, the biliary duct; d, the cystic duct; e, the place where these vessels meet; f, the hepatic artery; o, o, the hepatic nerves; p, p, p, p, the common capsula laid open; q, q, the lymphæducts; m, m, m, &c. the smaller branches of the vena portæ;

portæ; *n, n, n, &c.* the small branches of the vena cava.

Inflammation of the LIVER. See the article INFLAMMATION.

LIVER of sulphur, &c. See HEPAR.

LIVER-WORT, lichen, in botany. See the article LICHEN.

LIVERPOOL, or LEVERPOOL, a port-town of Lancashire, fifteen miles north of Chester, which sends two members to parliament.

LIVERY, in matters of dress and equipage, a certain colour and form of dress, by which noblemen and gentlemen choose to distinguish their servants.

LIVERY of seisin, in law, signifies delivering the possession of lands; &c. to him who has a right to them. There are two kinds of livery and seisin; livery in law, where the feoffer being in view of the land, house, or other thing granted, says to the feoffee on delivery of the deed, "I give to you yonder land, &c. to hold to you and your heirs, so go into the same, and take possession accordingly." And livery in deed, is where the parties, or the attornies by them authorized, coming to the door of the house, or upon some part of the land, declare the occasion of their meeting before witnesses, read the deed, or its contents, and in case it be made by attorney, the letter of attorney is also read, after which, if the delivery be of a house, the grantor, or his attorney, takes the ring, key, or latch belonging to the door, or if it be land, a turf, or clod of earth, and a twig of one of the trees, and delivering them with the deed to the grantee or his attorney, says, "I A. B. do hereby deliver to you possession and seisin of this messuage or tenement, &c. to hold to you, your heirs and assigns, according to the purport, true intent, and meaning of this indenture, or deed of feoffment." After which the grantee enters first alone, and shutting the door, and then opening it, lets in others.

When both a house and lands are conveyed, the house is looked upon as principal, and therefore the livery is made there. If lands lie in different parts of the same county, the livery and seisin of one part in one place, in the name of the whole granted in the feoffment, is sufficient; yet when they lie in different counties, livery and seisin must be made in each. If a person grants a lease for years, with remainder to another for life,

or in tail, &c. the livery and seisin must be made to the lessee for years, without which nothing will pass to the person in remainder.

Since the making the statute of uses, livery and seisin are not so much used as formerly; for a lease and release, a bargain and sale by deed inrolled, are sufficient to vest the grantee with possession, without the formality of livery.

LIVERYMEN, of London, are a number of men chosen from among the freemen of each company. Out of this body the common council, sheriff, and other superior officers for the government of the city are elected, and they alone have the privilege of giving their votes for members of parliament; from which the rest of the citizens are excluded.

LIVONIA, a province of Russia, 160 miles long, and 120 broad; bounded by the gulph of Finland, on the north; by Ingria and great Novogorod, on the east; by Lithuania and Courland, on the south; and by the Baltic, on the west: its chief towns are Narva, Revel, and Riga.

LIVONICA TERRA, in the materia medica, a kind of fine bole used in the shops of Germany and Italy, of which there are two species, the yellow, and the red; the distinguishing characters of which are these: the yellow livonian earth is a pure and perfectly fine bole, of a shattery, friable texture, considerably heavy, and of a dull, dusky yellow, which has usually some faint blush of reddishness in it: it is of a smooth surface, and does not stain the hands; it adheres firmly to the tongue, and melts freely in the mouth, leaving no grittiness between the teeth, and does not ferment with acid menstua. The red livonian earth is an impure bole, of a loose texture, and of a pale red: it is of a smooth surface, breaks easily between the fingers, and does not at all stain the hands; it melts freely in the mouth, has a very strongly astringent taste, but leaves a grittiness between the teeth, and does not ferment with acid menstua. These earths are both dug out of the same pit, in the place from whence they have their name, and in some other parts of the world. They are generally brought to us made up into little cakes, and sealed with the impression of a church, and an escutcheon with two cross keys. In Spain and Portugal they are much used, sometimes singly, sometimes mixed together, and are good in fevers and in fluxes of all kinds. The red is the more powerful

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ful astringent. The Spaniards and Portuguese make also a light kind of earthen ware of them.

LIVRE, a french money of account, containing twenty sols. See the articles **COIN** and **MONEY**.

LIXIVIOUS, an appellation given to salts, obtained from burnt vegetables by lotion. See the article **SALT**.

LIXIVIUM, in pharmacy, &c. a ley, obtained by pouring some liquor upon the ashes of plants; which is more or less powerful, as it has imbibed the fixed salts contained in the ashes.

Lixiviums are not only useful in medicine, but in many manufactures, dyeing, bleaching, &c. See **DYEING** and **BLEACHING**. The lixivium saponarium, or soap leys, is a form of medicine mentioned in the London dispensatory, and ordered to be made in the following manner: Take equal weights of russia-potash, and quick-lime, and throw water upon them by degrees, till the lime is slacked; then throw on more water, and stir all together, that the salt of the ashes may be dissolved; after some time pour the liquor, filtered through paper, if needful, into another vessel. It is much used in cases of the stone.

LIZARD, *lacerta*, in zoology, a genus of amphibious animals, the body of which is oblong and rounded, the legs four, and the hinder part terminated by a tapering tail.

The species of lizards are very numerous, being distinguished chiefly by the number of their toes. See plate **CLXII**. fig. 1. where, n^o 1. represents the long-tailed lizard, called from the fierceness of its aspect, the lion-lizard; and n^o 2. another lizard with five toes on each foot, and a long and rounded tail, and plicated sides.

LIZARD, in geography, a cape, or promontary of Cornwall, fifteen miles south of Falmouth: west long. 5° 47', north lat. 49° 50'.

LOACH the english name of a fish, called by Artedi, the smooth spotted cobitis, with a cylindrical body. See **COBITIS**.

LOAD, among miners, denotes a vein of ore. See the article **MINE**.

It is also used for nine dishes of ore. See the article **DISH**.

LOADSTONE, the same with magnet. See the article **MAGNET**.

LOAMS, in natural history, are defined to be earths composed of dissimilar particles, hard, stiff, dense, and hard and rough to the touch; not easily ductile while

moist, readily diffusible in water, and composed of sand, and a tough viscid clay. Of these loams, some are whitish, and others brown or yellow.

LOBE, in anatomy, any fleshy protuberant part, as the lobes of the lungs, lobes of the ears, &c. See **LUNGS** and **EAR**.

LOBELIA, in botany, a genus of the syngenesia-polygamia class of plants, the flower of which is monopetalous, and slightly ringent: the fruit is an oval capsule, containing a great number of very small seeds.

LOCAL, in law, something fixed to the freehold, or tied to a certain place: thus real actions are local, since they must be brought in the country where they lie; and local customs are those peculiar to certain countries and places.

LOCAL COLOURS, in painting, such as are natural, and proper for each object in a picture. See the article **PICTURE**.

LOCAL MEDICINES, those destined to act upon particular parts: such are fomentations, epithems, vesicatories, &c. See the article **FOMENTATION**, &c.

LOCAL PROBLEM, among mathematicians, such a one as is capable of an infinite number of different solutions, by reason that the point which is to resolve the problem may be indifferently taken within a certain extent, as suppose any where, within such a line, within such a plane figure, &c. which is called a geometric locus, and the problem is said to be a local or indetermined one. See **LOCUS**. A local problem may be either simple, when the point sought is in a right line; plane, when the point sought is in the circumference of a circle; solid, when the point required is in the circumference of a conic section; or lastly, sursolid, when the point is in the perimeter of a line of the second gender, or of an higher kind, as geometers call it.

LOCATELLUS's BALSAM, in pharmacy, a celebrated balsam, the preparation whereof is directed in the London dispensatory as follows: Take of oil-olive, one pint; Strasburg turpentine and yellow wax, each half a pound; red saunders, six drams; melt the wax over a gentle fire, with some part of the oil; then add the rest of the oil and the turpentine; afterwards mix in the saunders, and keep them stirring together until the mixture is grown cold. The Edinburgh dispensatory directs it to be made thus: Take of yellow wax, one pound; oil-olive, a pint and a half; Venice-turpentine, a pound

pound and a half; balsam of Peru, two ounces; dragon's blood, one ounce; melt the wax in the oil over a gentle fire; then add the turpentine, and having taken them from the fire, mix in the balsam of Peru and dragon's blood, keeping them continually stirring till grown cold.

This balsam is used in internal bruises and hæmorrhages, erosions of the intestines, ulcerations of the lungs, dysenteries, and in some coughs and asthmas; the dose is from two scruples to two drams; it may be commodiously exhibited along with about double its weight of conserve of roses: some have likewise applied it externally, for deterging and incarnating recent wounds and ulcers.

LOCHABER. See LOQUABYR.

LOCHIA, in medicine, a flux from the uterus, consequent to delivery. See the article DELIVERY.

This flux proceeds from the appendices cæcæ, after the separation of the placenta, and is useful and even necessary to unload the vessels of the womb: it is at first bloody, and retains a sanguine colour for three or four days, till at length it becomes like the washings of flesh. In ten or twelve days it is milky, and at last lymphatic: though, in some, it continues but twelve hours, in others twenty-four.

After delivery, therefore, the woman should be put to bed, and a folded sheet put under her to receive the lochia: warm linen should also be applied to the genital parts, to keep out the air; and a compress, dipt in warm wine, should be applied to the belly, but not too tight. When the flux of the lochia is moderate, it requires no assistance; but if immoderate, which very frequently happens, it is attended with weakness, loathing, fainting, convulsions, a slow, weak, or intermitting pulse, excessive paleness, dimness of sight, and a tingling in the ears. In this case, Astruc directs bleeding; and if any part of the placenta remains in the womb, it should be searched for, and taken out. Internally attemperating medicines are to be given, to quiet the commotion of the blood: such are nitre, crabs-eyes, cinnabar, and other alkaline absorbents; and if these are insufficient, the milder astringents are to be called in. Sydenham recommends an incrassating diet, and the following drink: mix equal quantities of plantain-water, and red wine, which boil down one third, sweetening it with sugar; and

of this, when cold, let the patient drink half a pound twice or thrice a-day.

If an immoderate flux of the lochia be dangerous, a suppression of it is more so; the abdomen swells; the breathing is difficult; and faintings, cold sweats, and the rigours of acute fevers supervene. In this case, if the patient's strength will permit, let blood, and give her an emollient and diluent ptisan of althæa, as also emollient clysters; applying fomentations of marsh-mallows on the region of the uterus. If these give ease, you may prescribe gentle aperitives, as saffron taken like tea; and her feet should be bathed in warm water. If the flux is only diminished, you may give tincture of myrrh, amber, and saffron, together or single, in small doses, in tea, often in a day, or elixir proprietatis. If the lochia are quite suppressed, there is almost always a fever; in which case, all forcing medicines are unsafe; and therefore bleeding in the foot, in plethoric persons, will be proper, with attemperating, absorbent, and nitrous powders, diaphoretic potions, and aqueous liquors, as in acute fevers. See the article FEVER.

LOCHMABEN, a town of Scotland, fifteen miles east of Dumfries.

LOCK, an instrument used for fastening doors, chests, &c. generally opened by a key. See the article KEY.

The lock is esteemed the master-piece in smithery; much art and delicacy being required in contriving and varying the wards, bolts and springs. From the different structure of locks, accommodated to their different use, they acquire different names: thus those placed on outer doors are called stock-locks; those on inner doors, spring-locks; those on trunks, trunk-locks, pad-locks, &c. Of these the spring lock is the most curious: its principal parts are, the main-plate, the cover-plate, and the pin-hole: to the main plate belong the key-hole, top-hook, cross-wards, bolt-toe, or bolt-nab, drawback spring, tumbler, pin of the tumbler, and the staples; to the cover-plate belong the pin, main-ward, cross-ward, step-ward, or dapper-ward; to the pin-hole belong the hook-ward, main cross-ward, shank, the pot or bread, bit, and bow-ward. The importation of locks is prohibited.

LOCKMAN, an officer in the Isle of Man, who executes the orders of the government, much like our under sheriff.

LOCKRIDA,

LOCRIDA, a town of Turkey in Europe, seventy miles south-east of Durazzo: east long. 21° , north lat. 41° .

LOCUS GEOMETRICUS, denotes a line, by which a local or indeterminate problem is solved. See LOCAL PROBLEM. A locus is a line, any point of which may equally solve an indeterminate problem. Thus, if a right line suffice for the construction of the equation, it is called *locus ad rectum*; if a circle, *locus ad circulum*; if a parabola, *locus ad parabolam*; if an ellipsis, *locus ad ellipsin*; and so of the rest of the conic sections.

The loci of such equations as are right lines, or circles, the antients called *plain loci*; and of those that are parabolas, hyperbolas, &c. *solid loci*. But Wolfius, and others, among the moderns, divide the loci more commodiously into orders, according to the numbers of dimensions to which the indeterminate quantities rise. Thus, it will be a locus of the first

order, if the equation is $x = \frac{ay}{c}$; a lo-

cus of the second or quadratic order, if $y^2 = ax$, or $y^2 = a^2 - x^2$; a locus of the third or cubic order, if $y^3 = a^2x$, or $y^3 = ax^2 - x^3$, &c.

The better to conceive the nature of the locus, suppose two unknown and variable right lines AP, PM (plate CLIX. fig. 4. n^o 1, 2.) making any given angle APM with each other; the one whereof, as AP, we call x , having a fixed origin in the point A, and extending itself indefinitely along a right line given in position; the other PM, which we call y , continually changing its position, but always parallel to itself. An equation only containing these two unknown quantities x and y , mixed with known ones, which expresses the relation of every variable quantity AP (x) to its correspondent variable quantity PM (y): the line passing through the extremities of all the values of y , i. e. through all the points M, is called a *geometrical locus*, in general, and the locus of that equation in particular.

All equations, whose loci are of the first order, may be reduced to some one of

the four following formulas: 1. $y = \frac{bx}{a}$.

2. $y = \frac{bx}{a} + c$. 3. $y = \frac{bx}{a} - c$. 4. $y =$

$c - \frac{bx}{a}$. Where the unknown quantity y ,

is supposed always to be freed from frac-

tions, and the fraction that multiplies the other unknown quantity x , to be reduced to this expression $\frac{b}{a}$, and all the

known terms to c .

The locus of the first formula being already determined: to find that of the se-

cond, $y = \frac{bx}{a} + c$; in the line AP, (n^o 3.)

take AB = a , and draw BE = b , AD = c and parallel to PM. On the same side AP, draw the line AE of an indefinite length towards E, and the indefinite straight line DM parallel to AE. Then the line DM is the locus of the aforesaid equation, or formula; for if the line MP be drawn from any point M thereof parallel to AQ, the triangles ABE, and APF, will be similar; and therefore AB (a): BE (b) :: AP

(x) PF = $\frac{bx}{a}$; and consequently PM

(y) = PF ($= \frac{bx}{a}$) + FM (c .)

To find the locus of the third form,

$y = \frac{bx}{a} - c$, proceed thus: assume AB = a

(n^o 4.); and draw the right lines BE = b , AD = c and parallel to PM, the one on one side AP, and the other on the other side: and through the points A, E, draw the line AE of an indefinite length towards E, and thro' the point D, the line DM parallel to AE: then the indefinite right line GM shall be the locus sought; for we shall have always

PM = (y) = PF = ($\frac{bx}{a}$) - FM (c).

Lastly, to find the locus of the fourth

formula, $y = c - \frac{bx}{a}$; in AP (n^o 5.)

take AB = a , and draw BE = b , AD = c , and parallel to PM, the one on one side AP, and the other on the other side; and through the points A, and E, draw the line AE indefinitely towards E, and through the point D draw the line DM parallel to AE. Then DG shall be the locus sought; for if the line MP be drawn from any point M thereof, parallel to AQ, then we shall always have PM = FM - PF, that is

$y = c - \frac{bx}{a}$.

Hence it appears, that all the loci of the first degree are straight lines; which may be easily found, because all their equations

tions may be reduced to some one of the foregoing formulas.

All loci of the second degree are conic sections, *viz.* either the parabola, the circle, ellipsis, or hyperbola: if an equation therefore be given, whose locus is of the second degree, and it be required to draw the conic section, which is the locus thereof; first draw a parabola, ellipsis, or hyperbola; so as that the equations expressing the natures thereof may be as compound as possible. In order to get general equations, or formulas, by examining the peculiar properties whereof we may know which of these formulas the given equation ought to have regard to; that is, which of the conic sections will be the locus of the proposed equation. This known, compare all the terms of the proposed equation with the terms of the general formula of that conic section, which you have found will be the locus of the given equation; by which means you will find how to draw the section, which is the locus of the equation given.

For example; let $AP = x$, $PM = y$, be unknown, and variable straight lines (*n^o 6.*); and let m, n, p, r, s , be given right lines: in the line AP take $AB = m$, and draw $BE = n$, $AD = r$ and parallel to PM ; and through the point A draw $AE = e$, and through the point D the indefinite right line DG parallel to AE . In DG take $DC = s$, and with CG , as a diameter, having its ordinates parallel to PM , and the line $CH = p$, as the parameter, describe a parabola CM : then the portion thereof, included in the angle PAD , will be the locus of the following general formula:

$$yy - \frac{2nxy}{m} + \frac{nnxx}{mm} - 2ry + \frac{2nrx}{m} + rr - \frac{epx}{m} + ps = 0.$$

For if from any point M of that portion there be drawn the right line MP , making any angle APM with MP ; the triangles ABE , APF , shall be similar; therefore,

$$AB : AE :: AP : AF \text{ or } DG; \text{ that is, } m : e :: x : \frac{ex}{m}.$$

$$\text{And } AB : BE :: AP : PF; \text{ that is, } m : n :: x : \frac{nx}{m}.$$

$$\text{And consequently } GM \text{ or } PM - PF - FG = y - \frac{nx}{m} - r. \text{ And } CG \text{ or } DG - DC = \frac{ex}{m} - s. \text{ But from the nature of}$$

the parabola $GM^2 = CG \times CH$; which equation will become that of the general formula, by putting the literal values of those lines.

Again, if through the fixed point A you draw the indefinite right line AQ (*n^o 7.*) parallel to PM , and you take $AB = m$, and draw $BE = n$ and parallel to AP , and thro' the determinate points A, E , the line $AE = e$; and if in AP you take $AD = r$: and draw the indefinite straight line DG parallel to AE , and take $DC = s$: This being done, if with the diameter CG , whose ordinates are parallel to AP , and parameter the line $CH = p$, you describe a parabola CM ; the portion of this parabola contained in the angle BAP shall be the locus of this second equation, or formula:

$$xx - \frac{2nyx}{m} + \frac{nnyy}{mm} - 2rx + \frac{2nry}{m} + rr - \frac{epy}{m} + ps = 0.$$

For if the line MQ be drawn from any point M , therein, parallel to AP ; then will, $AB : AE :: AQ$ or $PM : AF$

or DG ; that is, $m : e :: y : \frac{ey}{m}$; and

$AB : BE :: AQ : QF$; that is, $m : n :: y : \frac{ny}{m}$. And therefore GM or

$$QM - QF - FG = x - \frac{ny}{m} - r; \text{ and } CG \text{ or } DG - DC = \frac{ey}{m} - s.$$

And so by the common property of the parabola, you will have the foregoing second equation, or formula. So likewise may be found general equations for the other conic sections.

Now if it be required to draw the parabola, which we find to be the locus of this proposed equation $yy - 2ay - bx + cc = 0$; compare every term of the first formula with the terms of the equation, because yy in both is without fractions; and then will $\frac{2n}{m} = 0$, because

the rectangle xy not being in the proposed equation, the said rectangle may be esteemed as multiplied by a ; whence $n = 0$, and $m = e$; because the line AE falling in AB , that is, in AP in the construction of the formula, the points B, E , do coincide. Therefore destroying all

the terms affected with $\frac{n}{m}$ in the formula, and substituting m for e , we shall get $yy - 2$

$-2ry - px + rr + ps = 0$. Again, by comparing the correspondent terms $-2ry$ and $-2ay$, as also $-px$ and $-bx$, we have $r = a$, and $p = b$; and comparing the terms wherein are neither of the unknown quantities x, y , we get $rr + ps = cc$; and substituting a and b ,

for r and p , then will $s = \frac{cc - aa}{b}$, which

is a negative expression when a is greater than c , as is here supposed. There is no need of comparing the first terms yy and yy , because they are the same. Now the values of n, r, p, s , being thus found, the sought locus may be constructed by means of the construction of the formula, and after the following manner.

Because $BE = n = 0$ (n° 8.) the points B, E , do coincide, and the line AE falls in AP ; therefore thro' the fixed point A draw the line $AD = r = a$ parallel to PM , and draw DG parallel to AP , in

which take $DC = \frac{aa - cc}{b} = -s$; then

with DC , as a diameter, whose ordinates are right lines parallel to PM , and parameter the line $CH = p = b$, describe a parabola: then the two portions OMM, RMS , contained in the angle PAO , formed by the line AP , and the line AO drawn parallel to PM , will be the locus of the given equation, as is easily proved.

If in a given equation whose locus is a parabola, xx is without a fraction; then the term of the second formula must be compared with those of the given equation.

Thus much for the method of constructing the loci of the equations which are conic sections. If, now, an equation, whose locus is a conic section, be given, and the particular section whereof it is the locus be required: all the terms of the given equation being brought over to one side, so that the other be equal to nothing, there will be two cases.

Case I. When the rectangle xy is not in the given equation. 1. If either yy or xx be in the same equation, the locus will be a parabola. 2. If both xx and yy are in the equation with the same signs, the locus will be an ellipsis, or a circle. 3. If xx and yy have different signs, the locus will be an hyperbola, or the opposite sections regarding their diameters.

Case II. When the rectangle xy is in the given equation. 1. If neither of the squares xx or yy , or only one of them,

be in the same, the locus of it will be an hyperbola between the asymptotes. 2. If yy and xx be therein, having different signs, the locus will be an hyperbola regarding its diameters. 3. If both the squares xx and yy are in the equation, having the same signs, you must free the square yy from fractions; and then the locus will be an hyperbola, when the square of $\frac{1}{2}$ the fraction multiplying xy , is equal to the fraction multiplying xx , an ellipsis, or circle, when the same is less; and an hyperbola, or the opposite sections, regarding their diameters, when greater.

LOCULAMENT, among botanists, denotes a cell, or partition, in a seed-pod, for the seed of a plant. See **PLANT**.

In one plant we meet with one loculament in a pod; in others, with two, three, or more.

LOCUST, *locusta*, in zoology, the name of several species of gryllus. See the article **GRYLLUS**.

The great green locust, with a straight ensiform tail, is near two inches in length, and about the thickness of a man's little finger; it is common in pastures, in many parts of Europe; and is called by authors, *locusta viridis major*.

The country of the Cossacks, in dry summers, is much infested with prodigious swarms of locusts; which devour all the corn and pasture.

LOCUST-TREE, in botany, a name by which the people of the West-Indies call a species of acacia. See **ACACIA**.

LODGMENT, in military affairs, is a work raised with earth, gabions, fascines, wool-packs, or mantelets, to cover the besiegers from the enemies fire, and to prevent their losing a place which they have gained, and are resolved, if possible, to keep. For this purpose, when a lodgment is to be made on the glacis, covert-way, or in a breach, there must be great provision made of fascines, sand-bags, &c. in the trenches; and during the action, the pioneers with fascines, sand-bags, &c. should be making the lodgment, in order to form a covering in as advantageous a manner as possible from the opposite bastion, or the place most to be feared.

LOEFLINGIA, in botany, a genus of the triandria monogynia class of plants, the calyx of which is a five-leaved, erect perianthium; the corolla consists of five very small, oblong, oval petals, forming a globe: the fruit is an oval, three-cornered capsule, composed of three

Fig. 1. The LIVER of a Fœtus

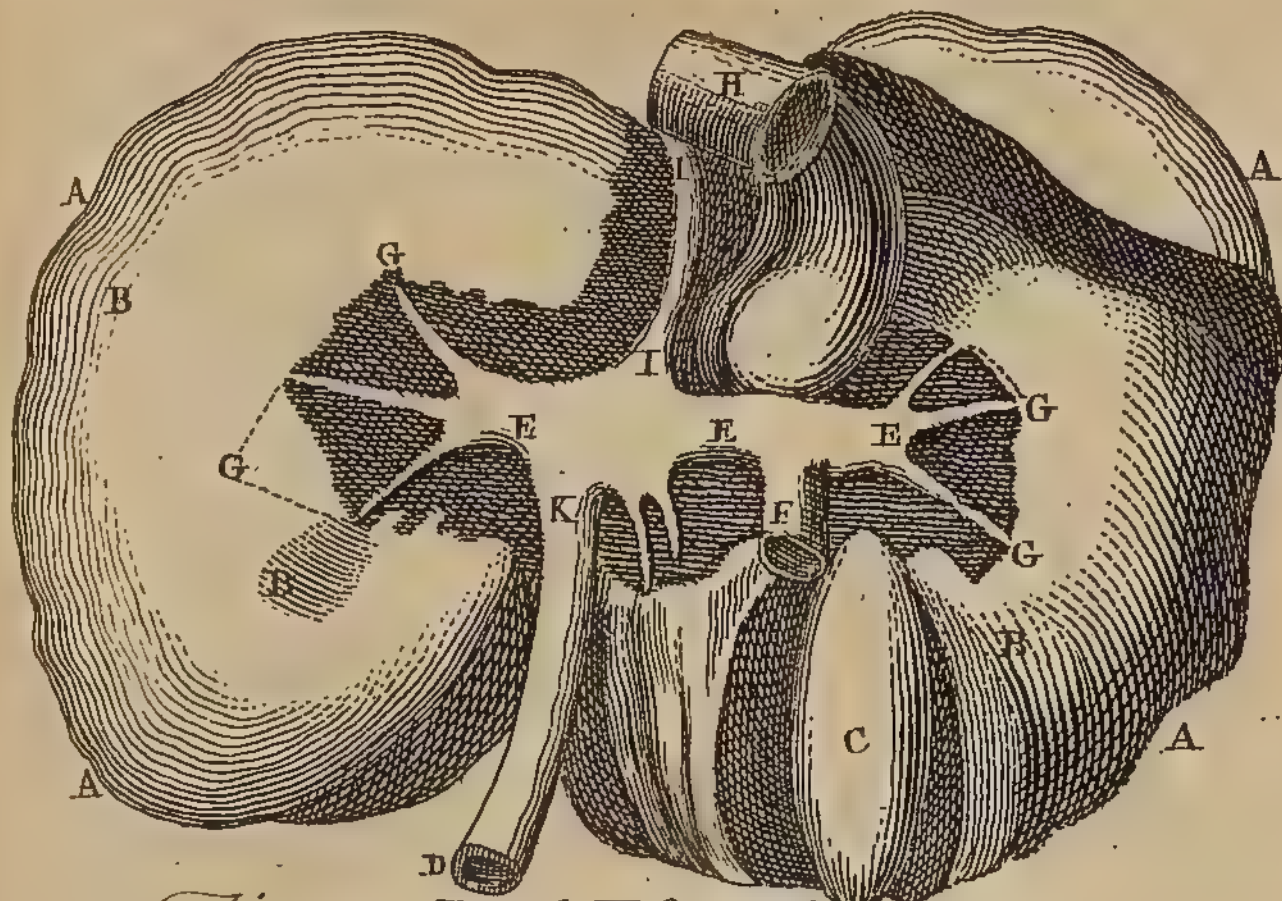
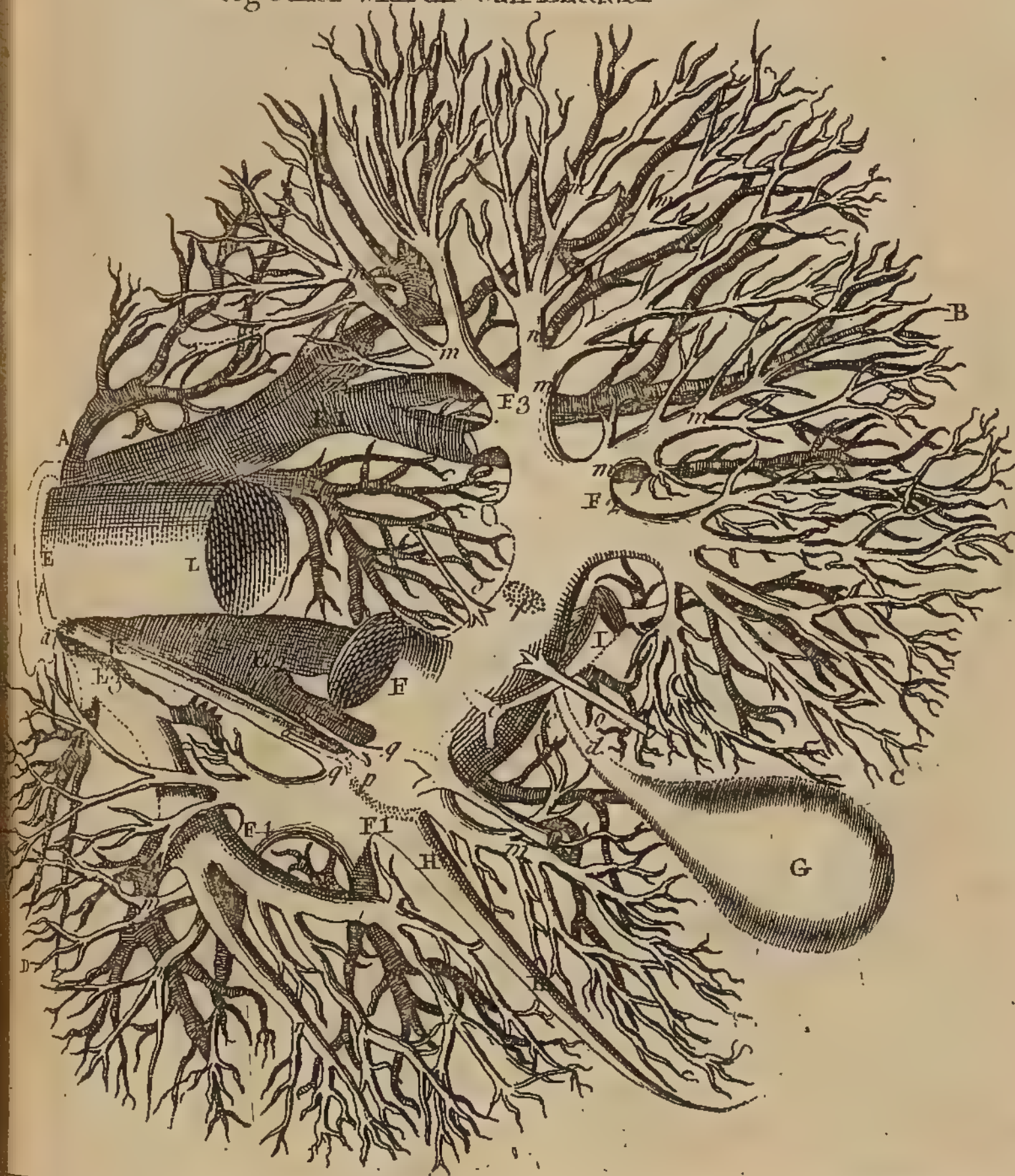


Fig. 2. The Blood-Vessels of the LIVER,
together with the Gall-Bladder



three valves, and containing three cells; the seeds are numerous and oval.

LOESELIA, in botany, a genus of the didynamia-angiospermia class of plants, the flower of which is monopetalous, and quinquifid at the limb: the fruit is a trilocular capsule, with several angulated seeds in each cell.

LOG, in naval affairs, is a flat piece of wood, shaped somewhat like a flounder, with a piece of lead fastened to its bottom, which makes it stand or swim upright in the water. See plate CLXII. fig. 2.

To this log is fastened a long line, called the log-line; and this is commonly divided into certain spaces fifty feet in length, by knots, which are pieces of knotted twine, inreeved between the strands of the line; which shew, by means of an half minute glass, how many of these spaces or knots are run out in half a minute. They commonly begin to be counted at the distance of about ten fathoms, or sixty feet from the log; that so the log, when it is hove over-board, may be out of the eddy of the ship's wake before they begin to count, and for the ready discovery of this point of commencement, there is commonly fastened at it a red rag.

The log being thus prepared, and hove over-board from the poop, and the line veered out by the help of a reel, as fast as the ship sails from it, will shew how far the ship has run in a given time; and consequently her rate of sailing.

Hence it is evident, that as the distance of the knots bears the same proportion to a mile, as half a minute does to an hour, whatever number of knots the ship runs in half a minute, the same number of miles she will run in an hour, supposing her to run with the same degree of velocity during that time; and therefore, in order to know her rate of sailing, it is the general way to heave the log every hour; but if the force or direction of the wind vary, and does not continue the same during the whole hour, or if there has been more sail set, or any sail handed in, by which the ship has sailed faster or slower than she did at the time of heaving the log, there must then be an allowance made for it accordingly.

LOG-BOARD, a table generally divided into five columns, in the first of which is entered the hour of the day; in the second, the course steered; in the third, the number of knots ran off the reel each

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time of heaving the log; in the fourth, from what point the wind blows; and in the fifth, observations on the weather, variation of the compass, &c.

LOG-BOOK, a book ruled in columns like the log-board, into which the account on the log-board is transcribed every day at noon; from whence, after it is corrected, &c. it is entered into the journal.

LOG-WOOD, in commerce, the wood of a tree called, by botanists, hæmatoxylum. See the article HÆMATOXYLUM.

Logwood is used by dyers, for dyeing blacks and blues.

LOGARITHMIC, in general, something belonging to logarithms. See the article LOGARITHMS.

LOGARITHMIC CURVE. If on the line AN (plate CLII. fig. 3.) both ways indefinitely extended, be taken, AC, CE, EG, GI, IL, on the right hand. And also Ag, gP, &c. on the left, all equal to one another. And, if at the points P, g, A, C, E, G, I, L, be erected to the right line, AN, the perpendiculars PS, gd, AB, CD, EF, GH, IK, LM, which let be continually proportional, and represent numbers, viz. AB, 1; CD, 10, EF 100, &c. then shall we have two progressions of lines, arithmetical and geometrical: for the lines AC, AE, AG, &c. are in arithmetical progression, or as 1, 2, 3, 4, 5, &c. and so represent the logarithms to which the geometrical lines AB, CD, EF, &c. do correspond. For since AG is triple of the right line AC, the number GH shall be in the third place from unity, if CD be in the first: so, likewise, shall LM be in the fifth place, since AL = 5 AC. If the extremities of the proportionals S, d, B, D, F, &c. be joined by right lines, the figure SBML will become a polygon, consisting of more or less sides, according as there is more or less terms in the progression.

If the parts AC, CE, EG, &c. be bisected in the points c, e, g, i, l, and there be again raised the perpendiculars cd, ef, gh, ik, lm, which are mean proportionals between AB, CD; CD, EF, &c. then there will arise a new series of proportionals, whose terms beginning from that which immediately follows unity, are double of those in the first series, and the difference of the terms are become less, and approach nearer to a ratio of equality than before. Likewise, in this new series, the right lines AL, Ae, express the distances

of the terms LM, cd , from unity; *viz.* since AL is ten times greater than Ac , LM shall be the tenth term of the series from unity; and, because Ae is three times greater than Ac , ef will be the third term of the series if cd be the first, and there shall be two mean proportionals between AB and ef ; and between AB and LM there will be nine mean proportionals. And if the extremities of the lines $Bd, Df, Fb, &c.$ be joined by right lines, there will be a new polygon made, consisting of more but shorter sides than the last.

If, in this manner, mean proportionals be continually placed between every two terms, the number of terms at last will be made so great, as also the number of the sides of the polygon, as to be greater than any given number, or to be infinite; and every side of the polygon so lessened, as to become less than any given right line; and consequently the polygon will be changed into a curve-lined figure: for any curve-lined figure may be conceived as a polygon, whose sides are infinitely small and infinite in number. A curve described after this manner, is called logarithmical.

It is manifest from this description of the logarithmic curve, that all numbers at equal distances are continually proportional. It is also plain, that if there be four numbers, AB, CD, IK, LM , such that the distance between the first and second, be equal to the distance between the third and the fourth; let the distance from the second to the third be what it will, these numbers will be proportional. For because the distances AC, IL , are equal, AB shall be to the increment DC , as IK is to the increment MT . Wherefore, by composition, $AB : DC :: IK : ML$. And, contrariwise, if four numbers be proportional, the distance between the first and second shall be equal to the distance between the third and fourth.

The distance between any two numbers, is called the logarithm of the ratio of those numbers; and, indeed, doth not measure the ratio itself, but the number of terms in a given series of geometrical proportionals, proceeding from one number to another, and defines the number of equal ratios by the composition whereof the ratio of numbers are known.

LOGARITHMS, are the indexes or exponents (mostly whole numbers and decimal fractions, consisting of seven places

of figures at least) of the powers or roots (chiefly broken) of a given number; yet such indexes or exponents, that the several powers or roots they express, are the natural numbers 1, 2, 3, 4, 5, &c. to 10 or 100000, &c. (as if the given number be 10, and its index be assumed 10000000, then the 0.0000000 root of 10, which is 1, will be the logarithm of 1; the 0.301036 root of 10, which is 2, will be the logarithm of 2; the 0.477121 root of 10 which is 3, will be the logarithm of 3; the 0.612060 root of 10, the logarithm of 4; the 1.041393 power of 10 the logarithm of 11; the 1.079181 power of 10 the logarithm of 12, &c.) being chiefly contrived for ease and expedition in performing of arithmetical operations in large numbers, and in trigonometrical calculations; but they have likewise been found of extensive service in the higher geometry, particularly in the method of fluxions. They are generally founded on this consideration, that if there be any row of geometrical proportional numbers, as 1, 2, 4, 8, 16, 32, 64, 128, 256, &c. or 1, 10, 100, 1000, 10000, &c. And as many arithmetical progressional numbers adapted to them, or set over them, beginning with 0, thus, $\begin{cases} 0, 1, 2, 3, 4, 5, 6, 7, &c. \\ 1, 2, 4, 8, 16, 32, 64, 128, &c. \end{cases}$ or, $\begin{cases} 0, 1, 2, 3, 4, &c. \\ 1, 10, 100, 1000, 10000, &c. \end{cases}$ Then will the sum of any two of these arithmetical progressionals, added together, be that arithmetical progressional which answers to, or stands over the geometrical progressional, which is the product of the two geometrical progressionals over which the two assumed arithmetical progressionals stand: again, if those arithmetical progressionals be subtracted from each other, the remainder will be the arithmetical progressional standing over that geometrical progressional which is the quotient of the division of the two geometrical progressionals belonging to the two first assumed arithmetical progressionals; and the double, triple, &c. of any one of the arithmetical progressionals, will be the arithmetical progressional standing over the square, cube, &c. of that geometrical progressional which the assumed arithmetical progressional stands over, as well as the $\frac{1}{2}, \frac{1}{3}, &c.$ of that arithmetical progressional, will be the geometrical progressional answering to the square root, cube root, &c. of the arithmetical progressional over it: and from

from hence arises the following common, though lame and imperfect definition of logarithms; *viz.*

That they are so many arithmetical progressions, answering to the same number of geometrical ones. Whereas, if any one looks into the tables of logarithms, he will find, that these do not all run on in an arithmetical progression, nor the numbers they answer to in a geometrical one; these last being themselves arithmetical progressions. Dr. Wallis, in his history of algebra, calls logarithms, the indexes of the ratios of numbers to one another. Dr. Halley, in the Philosophical Transactions, n^o 216, says, they are the exponents of the ratios of unity to numbers. So, also, Mr. Cotes, in his Harmonia Mensurarum, says, they are the numerical measures of ratios: but all these definitions convey but a very confused notion of logarithms. Mr. Maclaurin, in his Treatise of Fluxions, has explained the natural and genesis of logarithms, agreeably to the notion of their first inventor, lord Naper. Logarithms then, and the quantities to which they correspond, may be supposed to be generated by the motion of a point: and if this point moves over equal spaces in equal times, the line described by it increases equally.

Again, a line decreases proportionably, when the point that moves over it describes such parts in equal times as are always in the same constant ratio to the lines from which they are subducted, or to the distances of that point, at the beginning of those lines, from a given term in that line. In like manner, a line may increase proportionably, if in equal times the moving point describes spaces proportional to its distances from a certain term at the beginning of each time. Thus, in the first case, let ac (plate CLX. fig. 2. n^o 1 and 2) be to ao , cd to co , de to do , ef to eo , fg to fo , always in the same ratio of QR to QS ; and suppose the point P sets out from a , describing ac , cd , de , ef , fg , in equal parts of the time; and let the space described by P in any given time, be always in the same ratio to the distance of P from o at the beginning of that time, then will the right line ao decrease proportionally.

In like manner, the line oa , (*ibid.* n^o 3.) increases proportionally, if the point p , in equal times, describes spaces ac , cd , de , ef , fg , &c. so that ac is to

ao , cd to co , de to do , &c. in a constant ratio. If we now suppose a point P describing the line AG (*ibid.* n^o 4.) with an uniform motion, while the point p describes a line increasing or decreasing proportionally, the line AP , described by P , with this uniform motion, in the same time that oa , by increasing or decreasing proportionally, becomes equal to op , is the logarithm of op . Thus AC , AD , AE , &c. are the logarithms of oc , od , oe , &c. respectively; and oa is the quantity whose logarithm is supposed equal to nothing.

We have here abstracted from numbers, that the doctrine may be the more general; but it is plain, that if AC , AD , AE , &c. be supposed, 1, 2, 3, &c. in arithmetic progression; oc , od , oe , &c. will be in geometric progression; and that the logarithm of oa , which may be taken for unity, is nothing.

Lord Naper, in his first scheme of logarithms, supposes, that while op increases or decreases proportionally, the uniform motion of the point P , by which the logarithm of op is generated, is equal to the velocity of p at a ; that is, at the term of time when the logarithms begin to be generated. Hence logarithms, formed after this model, are called Naper's Logarithms, and sometimes Natural Logarithms.

When a ratio is given, the point p describes the difference of the terms of the ratio in the same time. When a ratio is duplicate of another ratio, the point p describes the difference of the terms in a double time. When a ratio is triplicate of another, it describes the difference of the terms in a triple time; and so on. Also, when a ratio is compounded of two or more ratios, the point p describes the difference of the terms of that ratio in a time equal to the sum of the times, in which it describes the differences of the terms of the simple ratios of which it is compounded. And what is here said of the times of the motion of p when op increases proportionally, is to be applied to the spaces described by P , in those times, with its uniform motion.

Hence the chief properties of logarithms are deduced. They are the measures of ratios. The excess of the logarithm of the antecedent above the logarithm of the consequent, measures the ratio of those terms. The measure of the ratio of a greater quantity to a lesser is positive; as this ratio, compounded

with any other ratio, increases it. The ratio of equality, compounded with any other ratio, neither increases nor diminishes it; and its measure is nothing. The measure of the ratio of a lesser quantity to a greater is negative; as this ratio, compounded with any other ratio, diminishes it. The ratio of any quantity A to unity, compounded with the ratio of unity to A , produces the ratio of A to A , or the ratio of equality; and the measures of those two ratios destroy each other when added together; so that when the one is considered as positive, the other is to be considered as negative. By supposing the logarithms of quantities greater than $o a$ (which is supposed to represent unity) to be positive, and the logarithms of quantities less than it to be negative, the same rules serve for the operations by logarithms, whether the quantities be greater or less than $o a$. When $a p$ increases proportionally, the motion of p is perpetually accelerated; for the spaces $a c, c d, d e$, &c. that are described by it in any equal times that continually succeed after each other, perpetually increase in the same proportion as the lines $o a, o c, o d$, &c. When the point p moves from a towards o , and $o p$ decreases proportionally, the motion of p is perpetually retarded; for the spaces described by it in any equal times that continually succeed after each other, decrease in this case in the same proportion as $o p$ decreases.

If the velocity of the point p be always as the distance $o p$, then will this line increase or decrease in the manner supposed by lord Naper; and the velocity of the point p being the fluxion of the line $o p$, will always vary in the same ratio as this quantity itself. This, we presume will give a clear idea of the genesis, or nature of logarithms; but for more of this doctrine, see Maclaurin's Fluxions.

Construction of LOGARITHMS. The first makers of logarithms, had in this a very laborious and difficult task to perform; they first made choice of their scale or system of logarithms, that is, what set of arithmetical progressions should answer to such a set of geometrical ones, for this is entirely arbitrary; and they chose the decuple geometrical progressions, 1, 10, 100, 1000, 10000, &c. and the arithmetical one, 0, 1, 2, 3, 4, &c. or 0, 000000; 1, 000000; 2, 000000; 3, 000000; 4, 000000, &c. as the most convenient. After this they were to get

the logarithms of all the intermediate numbers between 1 and 10, 10 and 100, 100 and 1000, 1000 and 10000, &c. But first of all they were to get the logarithms of the prime numbers 3, 5, 7, 11, 13, 17, 19, 23, &c. and when these were once had, it was easy to get those of the compound numbers made up of the prime ones, by the addition or subtraction of their logarithms.

In order to this, they found a mean proportion between 1 and 10, and its logarithm will be $\frac{1}{2}$ that of 10; and so given, then they found a mean proportional between the number first found and unity, which mean will be nearer to 1 than that before, and its logarithm will be $\frac{1}{2}$ of the former logarithm, or $\frac{1}{4}$ of that of 10; and having in this manner continually found a mean proportional between 1 and the last mean, and bisected the logarithms, they at length, after finding 54 such means, came to a number 1,00000000000000001278191493200323442, so near to 1 as not to differ from it so much as $\frac{1}{100000000000000000000000000000000}$ part, and found its logarithm to be

0,00000000000000000551115123125782702, and

0000000000000000012781914932003235 to be the difference whereby 1 exceeds the number of roots or mean proportionals found by extraction; and then, by means of these numbers, they found the logarithms of any other numbers whatsoever; and that after the following manner: between a given number, whose logarithm is wanted, and 1, they found a mean proportional, as above, until at length a number (mixed) be found, such a small matter above 1, as to have 1 and 15 cyphers after it, which are followed by the same number of significant figures; then they said, as the last number mentioned above is to the mean proportional thus found, so is the logarithm above, viz.

0,00000000000000000551115123125782702 to the logarithm of the mean proportional number, such a small matter exceeding 1, as but now mentioned; and this logarithm being as often doubled as the number of mean proportionals, (formed to get that number) will be the logarithm of the given number. And this was the method Mr. Briggs took to make the logarithms. But if they are to be made to only seven places of figures, which are enough for common use, they had only occasion to find 25 mean proportionals, or, which is the same thing,

thing, to extract the $\frac{1}{3355432}$ th root of 10. Now having the logarithms of 3, 5, and 7, they easily got those of 2, 4, 6, 8 and 9; for since $\frac{10}{5} = 2$, the logarithm of 2 will be the difference of the logarithms of 10 and 5; the logarithm of 4 will be two times the logarithm of 2; the logarithm of 6 will be the sum of the logarithm of 2 and 3; and the logarithm of 9 double the logarithm of 3. So, also having found the logarithms of 13, 17 and 19, and also of 23 and 29, they did easily get those of all the numbers between 10 and 30, by addition and subtraction only; and so having found the logarithms of other prime numbers, they got those of other numbers compounded of them. But since the way above hinted at, for finding the logarithms of the prime numbers is so intolerably laborious and troublesome, the more skilful mathematicians that came after the first inventors, employing their thoughts about abbreviating this method, had a vastly more easy and short way offered to them from the contemplation and mensuration of hyperbolic spaces contained between the portions of an asymptote, right lines perpendicular to it, and the curve of the hyperbola: for if E C N (pl. CLXII. fig. 4, n^o 1.) be an hyperbola, and A D, A Q the asymptotes, and A B, A P, A Q, &c. taken upon one of them, be represented by numbers, and the ordinates B C, P M, Q N, &c. be drawn from the several points B, P, Q, &c. to the curve, then will the quadrilinear spaces B C M P, P M N Q, &c. viz. their numerical measures be the logarithms of the quotients of the division of A B by A P, A P by A Q, &c. since when A B, A P, A Q, &c. are continual proportionals, the said spaces are equal, as is demonstrated by several writers concerning conic sections. See HYPERBOLA.

Having said that these hyperbolic spaces, numerically expressed, may be taken for logarithms, we shall next give a specimen, from the great Sir Isaac Newton, of the method how to measure these spaces, and consequently of the construction of logarithms.

Let C A (*ibid.* n^o 2.) = A F be = 1, and A B = A b = x; then will $\frac{1}{1+x}$ be = B D, and $\frac{1}{1-x} = b d$; and putting these expressions into serieses, it will be $\frac{1}{1+x} = 1 - x + x^2 - x^3 + x^4 - x^5$, &c.

and $\frac{1}{1-x} = 1 + x + x^2 + x^3 + x^4 + x^5$, &c.
and $\frac{x}{1+x} = x - x^2 + x^3 - x^4 + x^5$, &c. and $\frac{x}{1-x} = x + x^2 + x^3 + x^4 + x^5$, &c. and taking the fluents, we shall have the area A F D B = $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5}$, &c. and the area A F d b, = $x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \frac{x^5}{5}$, &c. and the sum b d D B = $2x + \frac{2x^3}{3} + \frac{2x^5}{5} + \frac{2x^7}{7} + \frac{2x^9}{9}$, &c. Now if A B or a b be $\frac{1}{10} = x$, C b being = 0.9, and C B = 1.1, by putting this value of x in the equations above, we shall have the area b d D B = 0.2006706954621511 for the terms of the series will stand as you see in this table,

| | |
|--------------------|-----------|
| 0.2000000000000000 | = first |
| 6666666666666666 | = second |
| 4000000000000000 | = third |
| 285714286 | = fourth |
| 2222222 | = fifth |
| 18182 | = sixth |
| 154 | = seventh |
| 1 | = eighth. |

Term of the series.

0.2006706954621511
If the parts A d and A D of this area be added separately, and the lesser D A be taken from the greater d A, we shall have A d - A D = $x^2 + \frac{x^4}{2} + \frac{x^6}{3} + \frac{x^8}{4}$, &c. = 0.0100503358535014, for the terms reduced to decimals will stand thus:

| | |
|--------------------|-----------|
| 0.0100000000000000 | = first |
| 5000000000000000 | = second |
| 3333333333 | = third |
| 25000000 | = fourth |
| 2000000 | = fifth |
| 1667 | = sixth |
| 14 | = seventh |

Term of the series.

0.0100503358535014.
Now if this difference of the areas be added to, and subtracted from their sum before found, half the aggregate, viz. 0.1053605156578263 will be the greater area A d, and half the remainder, viz. 0.0953101798043249, will be the lesser area A D.

By the same tables, these areas A D and A d, will be obtained also when A B = A b are supposed to be $\frac{1}{100}$ or C B = 1.01, and C b = 0.99, if the numbers are but

but duly transferred to lower places, as

$$\begin{array}{r} 0.0200000000000000 = 1^{\text{st}}. \\ 6666666666 = 2^{\text{d}}. \\ 400000 = 3^{\text{d}}. \\ 28 = 4^{\text{th}}. \end{array} \left. \begin{array}{l} \text{Term} \\ \text{of the} \\ \text{series.} \end{array} \right\}$$

$$\text{Sum} = 0.0200006667066694 = \text{area } b D.$$

$$\begin{array}{r} 0.0001000000000000 = \text{first} \\ 50000000 = \text{second} \\ 3333 = \text{third} \end{array} \left. \begin{array}{l} \text{Term} \\ \text{of the} \\ \text{series.} \end{array} \right\}$$

$0.0001000050003333 = \text{area } Ad - AD.$
Half the aggregate $0.0100503358535014.$
 $= Ad$, and half the remainder, viz.
 $0.0099503308531681 = AD.$

And so putting $AB = Ab = \frac{1}{1000}$, or
 $CB = 1.001$ and $Cb = 0.999$, there will
be obtained $Ad = 0.00100050003335835$,
and $AD = 0.00099950013330835$.

After the same manner, if $AB = Ab$,
be $= 0.2$, or 0.02 , or 0.002 , these areas
will arise.

$$Ad = 0.2231435513142097, \text{ and}$$

$$AD = 0.1823215576939546, \text{ or}$$

$$Ad = 0.0202027073175194, \text{ and}$$

$$AD = 0.1098026272961797, \text{ or}$$

$$Ad = 0.002002, \text{ and } AD = 0.001.$$

From these areas, thus found, others
may be easily had from addition and sub-

traction only. For since $\frac{1.2}{0.8} \times \frac{1.2}{0.9} = 2$,
the sum of the areas belonging to the ra-
tios $\frac{1.2}{0.8}$ and $\frac{1.2}{0.9}$, (that is, insisting upon
the parts of the absciss 1.2 , 0.8 ; and
 1.2 , 0.9) viz.

$$0.405465, \&c. \text{ and } \begin{cases} AD = 0.18232, \&c. \\ Ad = 0.10536, \&c. \end{cases}$$

$$\text{Sum} = 0.28768, \&c.$$

$$\text{added thus, } \begin{cases} 0.40546, \&c. \\ 0.28768, \&c. \end{cases}$$

Total $= 0.69314$, $\&c.$ = the area
of $AFHG$, when CG is $= 2$. Also

since $\frac{1.2}{0.8} \times 2 = 3$, the sum 1.0986122 ,

$\&c.$ of the areas belonging to $\frac{1.2}{0.8}$ and 2 ,

will be the area of $AFGH$, when CG

$= 3$. Again, since $\frac{2 \times 2}{0.8} = 5$, and 2

$\times 5 = 10$; by adding $Ad = 0.2231$, $\&c.$

$AD = 0.1823$, $\&c.$ and $Ad = 0.1053$,

$\&c.$ together, their sum is 0.5108 , $\&c.$

and this added to 1.0986 , $\&c.$ the area

of $AFGH$, when $CG = 3$. You will

have $1.6093379124341004 = AFGH$,

when CG is 5 ; and adding that of 2

to this, gives $2.3025850929940457 =$

$AFGH$, when CG is equal to 10 ;
and since $10 \times 10 = 100$; and $10 \times 100 =$
 1000 ; and $\sqrt{5 \times 10 \times 0.98} = 7$, and 10
 $\times 1.1 = 11$, and $\frac{1000 \times 1.091}{7 \times 11} = 13$, and

$$\frac{1000 \times 0.998}{2} = 499; \text{ it is plain that the}$$

area $AFGH$ may be found by the com-
position of the areas found before, when
 $CG = 100$, 1000 , or any other of the
numbers above mentioned; and all these
areas are the hyperbolic logarithms of
those several numbers.

Having thus obtained the hyperbolic lo-
garithms of the numbers 10 , 0.98 , 0.99 ,
 1.01 , 1.02 ; if the logarithms of the four
last of them be divided by the hyperbolic
logarithm 2.3025850 , $\&c.$ of 10 , and
the index 2 , be added; or, which is the
same thing, if it be multiplied by its re-
ciprocal 0.4342944819032518 , the value
of the subtangent of the logarithmic curve,
to which Briggs's logarithms are adapted,
we shall have the true tabular logarithms
of 98 , 99 , 100 , 101 , 102 . These are
to be interpolated by ten intervals, and
then we shall have the logarithms of
all the numbers between 980 and 1020 ;
and all between 980 and 1000 , being
again interpolated by ten intervals, the
table will be as it were constructed. Then
from these we are to get the logarithms
of all the prime numbers, and their mul-
tiples less than 100 , which may be done
by addition and subtraction only: for

$$\frac{\sqrt{84 \times 1020}}{9945} = 2; \quad \frac{\sqrt[4]{8 \times 9963}}{984} = 3; \quad \frac{10}{2}$$

$$= 5; \quad \frac{\sqrt{98}}{2} = 7; \quad \frac{99}{9} = 11; \quad \frac{1001}{7 \times 11} = 13;$$

$$\frac{102}{6} = 17; \quad \frac{988}{4 \times 13} = 19; \quad \frac{9936}{16 \times 27} = 23;$$

$$\frac{986}{2 \times 17} = 29; \quad \frac{992}{32} = 31; \quad \frac{999}{27} = 37; \quad \frac{984}{24}$$

$$= 41; \quad \frac{989}{23} = 43; \quad \frac{987}{21} = 47; \quad \frac{9911}{11 \times 17} =$$

$$53; \quad \frac{9971}{13 \times 13} = 59; \quad \frac{9882}{2 \times 81} = 61; \quad \frac{9949}{3 \times 49} =$$

$$67; \quad \frac{994}{14} = 71; \quad \frac{9928}{8 \times 17} = 73; \quad \frac{9954}{7 \times 18} = 79;$$

$$\frac{996}{12} = 83; \quad \frac{9968}{7 \times 16} = 89; \quad \frac{9894}{6 \times 17} = 97; \text{ and}$$

thus having the logarithms of all the
numbers less than 100 , you have nothing
to do but interpolate the several times,
through ten intervals.

Now

Now the void places may be filled up by the following theorem. Let n be a number, whose logarithm is wanted; let x be the difference between that and the two nearest numbers, equally distant on each side, whose logarithms are already found; and let d be half the difference of their logarithms: then the required logarithm of the number n , will be had by adding

$$d + \frac{dx}{2n} + \frac{dx^2}{12n^2}, \text{ \&c. to the logarithm of}$$

the lesser number: for if the numbers are represented by Cp , CG , CP (*ib.* n^o 2.) and the ordinates p , Q , be raised; if n be wrote for CG , and x for GP , or Gp ,

$$\text{the area } pQP, \text{ or } \frac{2x}{n} + \frac{x^2}{2n^2} + \frac{x^3}{3n^3}, \text{ \&c.}$$

will be to the area pHG , as the difference between the logarithms of the extreme numbers, or $2d$, is to the difference between the logarithms of the lesser, and of the middle one; which, therefore,

$$\text{will be } \frac{\frac{dx}{n} + \frac{dx^2}{2n} + \frac{dx^3}{3n}}{\frac{x}{n} + \frac{x^3}{3n} + \frac{x^5}{5n}} = d + \frac{dx}{2n} + \frac{dx^2}{12n^2}, \text{ \&c.}$$

$$\frac{dx^3}{12n^3}, \text{ \&c.}$$

The two first terms $d + \frac{dx}{2n}$ of this series,

being sufficient for the construction of a canon of logarithms, even to 14 places of figures, provided the number, whose logarithm is to be found, be less than 1000; which cannot be very troublesome, because x is either 1 or 2: yet it is not necessary to interpolate all the places by help of this rule, since the logarithms of numbers, which are produced by the multiplication or division of the number last found, may be obtained by the numbers whose logarithms were had before, by the addition or subtraction of their logarithms. Moreover, by the difference of their logarithms, and by their second and third differences, if necessary, the void places may be supplied more expeditiously; the rule afore-going being to be applied only where the continuation of some full places is wanted, in order to obtain these differences.

By the same method rules may be found for the intercalation of logarithms, when of three numbers the logarithm of the lesser and of the middle number are given, or of the middle number and the greater; and this although the numbers should not

be in arithmetical progression. Also by pursuing the steps of this method, rules may be easily discovered for the construction of artificial sines and tangents, without the help of the natural tables. Thus far the great Newton, who says, in one of his letters to Mr. Leibnitz, that he was so much delighted with the construction of logarithms, at his first setting out in those studies, that he was ashamed to tell to how many places of figures he had carried them at that time: and this was before the year 1666; because, he says, the plague made him lay aside those studies, and think of other things.

Dr. Keil, in his Treatise of Logarithms, at the end of his Commandine's Euclid, gives a series, by means of which may be found easily and expeditiously the logarithms of large numbers. Thus, let z be an odd number, whose logarithm is sought: then shall the numbers $z-1$ and $z+1$ be even, and accordingly their logarithms, and the difference of the logarithms will be had, which let be called y . Therefore, also the logarithm of a number, which is a geometrical mean between $z-1$ and $z+1$, will be given, *viz.* equal to half the sum of the logarithms.

$$\text{Now the series } y \times \frac{1}{4z} + \frac{1}{24z^3} + \frac{181}{15120z^5} + \frac{13}{25200z^7}, \text{ \&c. shall be equal to the}$$

logarithm of the ratio, which the geometrical mean between the numbers $z-1$ and $z+1$, has to the arithmetical mean, *viz.* to the number z . If the number exceeds 1000, the first term of the series, *viz.* $\frac{y}{4z}$, is sufficient for producing the

logarithm to 13 or 14 places of figures, and the second term will give the logarithm to 20 places of figures. But if z be greater than 10000, the first term will exhibit the logarithm to 18 places of figures: and so this series is of great use in filling up the chiliads omitted by Mr. Briggs. For example, it is required to find the logarithm of 20001: the logarithm of 20000 is the same as the logarithm of 2, with the index 4 prefixed to it; and the difference of the logarithms of 20000 and 20001, is the same as the difference of the logarithms of the numbers 10000 and 10001, *viz.* 0.0000434272, &c. And if this difference be divided by 4z, or 80004, the quotient $\frac{y}{4z}$ shall be

0.000000000542813; and if the logarithm of the geometrical mean, viz.
4.301051709302416 be added to the quotient, the sum will be
4.301051709845230 = the logarithm of 20001.

Wherefore it is manifest that to have the logarithm to 14 places of figures, there is no necessity of continuing out the quotient beyond 6 places of figures. But if you have a mind to have the logarithm to 10 places of figures only, the two first figures are enough. And if the logarithms of the numbers above 20000 are to be found by this way, the labour of doing them will mostly consist in setting down the numbers. This series is easily deduced from the consideration of the hyperbolic spaces aforesaid. The first figure of every logarithm towards the left hand, which is separated from the rest by a point, is called the index of that logarithm; because it points out the highest or remotest place of that number from the place of unity in the infinite scale of proportionals towards the left hand: thus, if the index of the logarithm be 1, it shews that its highest place towards the left hand is the first place from unity; and therefore all logarithms which have 1 for their index, will be found between the tenth and hundredth place, in the order of numbers. And for the same reason all logarithms which have 2 for their index, will be found between the hundredth and thousandth place, in the order of numbers, &c. Whence universally the index or characteristic of any logarithm is always less by one than the number of figures in whole numbers, which answer to the given logarithm; and, in decimals, the index is negative.

As all systems of logarithms whatever, are composed of similar quantities, it will be easy to form, from any system of logarithms, another system in any given ratio; and consequently to reduce one table of logarithms into another of any given form. For as any one logarithm in the given form, is to its correspondent logarithm in another form; so is any other logarithm in the given form, to its correspondent logarithm in the required form; and hence we may reduce the logarithms of lord Naper into the form of Briggs's, and contrariwise. For as 2.302585092, &c. lord Naper's logarithm of 10, is to 1.0000000000, Mr. Briggs's logarithm of 10; so is any other logarithm in lord Naper's form, to the correspondent tabular logarithm in Mr. Briggs's form; and because the two first

numbers constantly remain the same; if lord Naper's logarithm of any one number be divided by 2.302585, &c. or multiplied by 4342944, &c. the ratio of 1.0000, &c. to 2.30258 &c. as is found by dividing 1.00000, &c. by 2.30258 &c. the quotient in the former, and the product in the latter, will give the correspondent logarithm in Briggs's form, and the contrary. And, after the same manner, the ratio of natural logarithms to that of Briggs's, will be found = 868588963806.

The use and application of LOGARITHMS.

It is evident, from what has been said of the construction of logarithms, that addition of logarithms must be the same thing as multiplication in common arithmetic; and subtraction in logarithms the same as division: therefore, in multiplication by logarithms, add the logarithms of the multiplicand and multiplier together, their sum is the logarithm of the product.

| | num. | logarithms |
|-----------------------|------|------------|
| Example. Multiplicand | 8.5 | 0.9294189 |
| Multiplier | 10 | 1.0000000 |
| Product | 85 | 1.9294189 |

And in division, subtract the logarithm of the divisor from the logarithm of the dividend, the remainder is the logarithm of the quotient.

| | num. | logarithms |
|-------------------|--------|------------|
| Example. Dividend | 9712.8 | 3.9873444 |
| Divisor | 456 | 2.6589648 |
| Quotient | 21.3 | 1.3283796 |

To find the complement of a LOGARITHM.

Begin at the left hand, and write down what each figure wants of 9, only what the last significant figure wants of 10; so the complement of the logarithm of 456, viz. 2.6589648, is 7.3410352.

In the rule of three. Add the logarithms of the second and third terms together, and from the sum subtract the logarithm of the first, the remainder is the logarithm of the fourth. Or, instead of subtracting a logarithm, add its complement, and the result will be the same.

To raise powers by LOGARITHMS. Multiply the logarithm of the number given, by the index of the power required, the product will be the logarithm of the power sought.

Example. Let the cube of 32 be required

ed by logarithms. The logarithm of 32 = 1.5051500, which multiplied by 3, is 4.5154500, the logarithm of 32768, the cube of 32. But in raising powers, *viz.* squaring, cubing, &c. of any decimal fraction by logarithms, it must be observed, that the first significant figure of the power be put so many places below the place of units, as the index of its logarithm wants of 10, 100, &c. multiplied by the index of the power.

To extract the roots of powers by LOGARITHMS. Divide the logarithm of the number by the index of the power, the quo-

tient is the logarithm of the root sought. To find mean proportionals between any two numbers. Subtract the logarithm of the least term from the logarithm of the greatest, and divide the remainder by a number more by one than the number of means desired; then add the quotient to the logarithm of the least term (or subtract it from the logarithm of the greatest) continually, and it will give the logarithms of all the mean proportionals required. Example. Let three mean proportionals be sought, between 106 and 100.

| | |
|---------------------------------------|--------------------------|
| Logarithm of 106 = | 2.0253059 |
| Logarithm of 100 = | 2.0000000 |
| Divide by 4) 0.0253059 (0.0063264.75 | |
| Logarithm of the least term 100 added | 2.0000000 |
| Logarithm of the first mean | 101.4673846 2.0063264.75 |
| Logarithm of the second mean | 102.9563014 2.0126529.5 |
| Logarithm of the third mean | 104.4670483 2.0189794.25 |
| Logarithm of the greatest term 106 | 2.0253059. |

LOGIC, λογική, the art of thinking and reasoning justly; or, it may be defined the science or history of the human mind, inasmuch as it traces the progress of our knowledge from our first and most simple through all their different combinations, conceptions, and all those numerous deductions that result from variously comparing them one with another. See the articles IDEA and KNOWLEDGE. The precise business of logic, therefore, is to explain the nature of the human mind, and the proper manner of conducting its several powers, in order to the attainment of truth and knowledge. It lays open those errors and mistakes we are apt, through inattention, to run into; and teaches us how to distinguish between truth, and what only carries the appearance of it. By this means we grow acquainted with the nature and force of the understanding; see what things lie within its reach; where we may attain certainty and demonstration; and when we must be contented with probability. These considerations sufficiently evince the usefulness of this science, which is divided into four parts, according to the number of the operations of the mind in its search after knowledge, *viz.* perception, judgment, reasoning, and method. See the articles PERCEPTION, &c. This valuable art of ranging our ideas, connecting them closely together, and consequently of facilitating the transition from one to another, supplies us with a means of rendering all mens abilities

nearly equal. In fact, all our knowledge is reducible to primitive sensations, which is nearly alike in all men. The art of combining and connecting our direct ideas only gives them a more or less exact arrangement and denomination; whence they become more or less sensible to others. A man who readily combines his ideas, differs but little from him who combines them slowly; as he who judges of a picture at sight, differs but little from him who requires to be made sensible of all its parts: both at the first glance have the same sensations, though they sink not so deep in the second, who therefore dwells longer upon each, to render them strong and distinct; and by this means, the reflex ideas of the first observer become as easy to the second as direct ones. And hence, perhaps, there is scarce an art or science that may not, by means of a well adapted logic, be taught to a slow understanding; because there are few arts or sciences, whose precepts or rules may not be reduced to simple notions, and disposed in so connected an order, that the chain need never be broken. As the mind is more or less slow in its operations, it requires more or less of this connected order. The advantage of a genius is that of having less occasion for it; or rather, of being able to form it quick and almost imperceptibly. See the article DEMONSTRATION. LOGISTIC CURVE, the same with that otherwise called logarithmic. See the article LOGARITHMIC.

LOGISTIC SPIRAL. See the articles **LOGARITHMIC** and **SPIRAL**.

LOGISTICA NUMERALIS, the same with algorithm. See **ALGORITHM**.

LOGISTICAL ARITHMETIC, the doctrine of sexagesimal fractions. See the article **SEXAGESIMALS**.

LOGOGRIPH, λογογραφία, a kind of riddle, which consists in some allusion, or mutilation of words; and is of a middle nature between an ænigma and rebus. See the articles **ÆNIGMA** and **REBUS**.

Some also give the appellation logogriffs to canting arms. See the article **ARMS**.

LOHOCH, or **LOCH**, in pharmacy, a composition of a middle consistence between a soft electuary and a syrup, principally used in disorders of the lungs.

There are several kinds of lohochs, denominated from the principal ingredient that enters into their composition. 1. The

common lohoch is made thus: take of fresh-drawn oil of sweet almonds, and of pectoral or balsamic syrup, one ounce; white-sugar, two drams; mix, and make them into a lohoch. 2. Lohoch of gum tragacanth is made thus: take of the powder of gum tragacanth, two drams; japan-earth, one dram; whites of eggs beat into a fluid, one ounce; syrup of meconium, two ounces: mix, as before. 3.

Lohoch of linseed oil is made thus: take of fresh-drawn linseed-oil, and balsamic syrup, each one ounce; flowers of sulphur, and white-sugar, each two drams: mix them. 4. Lohoch of manna, thus made: take of calabrian-manna, fresh-drawn oil of sweet-almonds, and syrup of violets, each equal quantities: mix them. 5. Lohoch of sperma ceti, is made thus: take two drams of sperma ceti, rub it together with as much yolk of eggs, as will fit it to mix with half an ounce of fresh-drawn oil of almonds, and one ounce of balsamic syrup, into the consistence of a lohoch.

LOINS, *lumbi*, in anatomy, the two lateral parts of the umbilical region of the abdomen. See the article **ABDOMEN**.

LOIRE, the largest river in France, rises in the mountains of the Cevennes, and, after running a course of about five hundred miles, falls into the bay of Biscay.

LOLIUM, **DARNEL**, in botany, a genus of the triandria digynia class of plants, the corolla whereof consists of two valves, the lower is narrow, lanceolated, convoluted, acuminate, and of the length of the cup; the other is short, linear, obtuse, and hollowed upwards; there is no

pericarpium, the corolla incloses the seed, which is single, oblong, compressed, convex on one side, and plane and sulcated in the middle on the other.

The seed of this plant is reckoned attenuant, abstergent, drying and heating.

LOMBARDY, a kingdom which comprehended almost all Italy. It was erected by the Longobards, or Lombards, a german nation, about the year 598, and lasted till Charlemain put an end to it, about the year 760.

LOMMOND, a lake in the county of Lenox, in Scotland, which runs almost the whole length of the county.

LOMWIA, in zoology, the name of a web-footed water-fowl, common on the english shores, about the size of a common duck.

LONCHITIS, **SPLEENWORT**, in botany, a genus of the cryptogamia-filicum class of plants, the fructifications of which are arranged into lunulated series, and disposed separately under the sinuses of the leaves.

The leaves of this plant are of use in healing wounds, and in preventing inflammations of them; they are also used against the spleen; the root is aperient and diuretic.

LONDON, the metropolis of Great Britain, where the first meridian is fixed on the british maps, lies in 51° 32' north lat. on the river Thames, and the greatest part on the north-side of that river. The form of London, including Westminster and Southwark, comes pretty near an oblong square, five miles in length, if measured, in a direct line from Hyde-Park to the end of Limehouse, and six miles, if we follow the windings of the streets; the greatest breadth is two miles and a half, and the circumference of the whole sixteen or seventeen miles, but it is not easy to measure it exactly, on account of its irregular form. The principal streets are generally level, exceeding well built, and extended to a very great length; these are inhabited by tradesmen, whose houses and shops make a much better figure than those of any tradesmen in Europe. People of distinction usually reside in elegant squares, of which there are great numbers at the west end of the town near the court. What mostly contributes to the riches and glory of this city, is the port, whither several thousand ships of burden annually resort from all countries, and where the greatest fleets never fail to meet with wealthy merchants.

merchants ready to take off the richest cargoes. The number of persons in the whole place are computed to be about eight hundred thousand.

LONDONDERRY, a city of Ireland, in the province of Ulster, and county of Londonderry, situated on the river Mourn, near its mouth, in west long. $7^{\circ} 40'$, north lat. $54^{\circ} 52'$.

LONG, an epithet given to whatever exceeds the usual standard of length: thus, we say, a long-boat, long accent, &c.

LONGÆVITY, length of life. See **AGE**.

Lord Bacon observes, that the succession of ages, and of the generation of men, seems no way to shorten the length of human life, since the age of man, down from Moses's time to the present, has stood at about eighty years, without gradually declining, as one might have expected; but doubtless there are times wherein men live to a longer or shorter age, in every country; and they generally prove longest-lived, whose times afford but a simple diet, and give greater occasion to bodily exercise; and shortest lived, whose times are more polite, or abound in luxury and ease; but these things have their changes and revolutions, whilst the succession of mankind holds one uninterrupted in its course: and no question but the same is the case in other animals, as neither oxen, horses, sheep, &c. have had their term of life shortened in the latter ages, and therefore the lives of creatures were at once abridged by the deluge, and the like may happen from other grand accidents, as particular inundations, long continued droughts, earthquakes, &c. The same author observes, that the inhabitants of cold, northern countries are generally longer lived than those of the southern regions; that high situations are more conducive to long life than low ones; and that the particular countries remarkable for long-lived inhabitants are, Arcadia, Ætolia, - hither India, Brasil, Ceylon, Britain, Ireland, the Orkneys, and the western Islands. The greatest instances of longævity in these our islands, are that of old Parr, who lived almost 153 years; of Jenkins, of Yorkshire, who lived 169 years; or of the countess Desmond, or Mr. Eckleston, both of Ireland, who each exceeded 140 years.

LONGFORD, a county of Ireland, in the province of Leinster, bounded by the county of Letrim and Cavan on the north, by Meath on the east and south, and by Roscommon on the west.

LONG-ISLAND, an island belonging to New-York in North America, lying between 71° and 74° west long. and in $41^{\circ} 30'$ north lat.

It is separated by a narrow channel from the continent of New-York and Connecticut, and contains three counties, viz. Queen's County, Suffolk County, and Richmond County.

LONGIMETRY, the art of measuring lengths, both accessible, as roads, &c. and inaccessible, as arms of the sea, &c. See **MEASURING**, **DISTANCE**, **CHAIN**, **THEODOLITE**, **CIRCUMFERENTOR**, &c.

LONGINICO, a town of the Morea, in Europe, situated on the river Alpheus, fifty miles south of Lepanto; being the ancient Olympia, where Hercules instituted the Olympic games. See the article **OLYMPIC GAMES**.

LONGISSIMUS DORSI, in anatomy, a very complex, long and narrow muscle, situated between the spinal apophyses and the sacro-lumbaris, from which it is divided by a fatty or cellular line; but, at the lower part, they are confounded together. It covers the semispinalis or transverso-spinalis dorsi, and semi-spinalis lumborum. Its upper part lies between the sacro-lumbaris and transversalis colli. This muscle, and the sacrolumbaris are common to the back and loins. The longissimus dorsi is an assistant to the sacro-lumbaris, especially to its vertebral portion, which it helps very powerfully both by the multiplicity and insertions of its fibres, in sustaining the vertebræ of the back and loins, while extended, whether in sitting or standing, and in preventing their sinking under the weight of the body, or any additional burden. It assists in performing, or counterbalancing all the motions and inflections which these vertebræ, especially those of the loins, are capable of in all postures of the body. And in this, it also bears some resemblance to the inferior or vertebral portion of the splenius. And these two muscles on each side, and the sacro lumbares, are of the number of those called *vertebrales obliqui divergentes*.

LONGISSIMUS OCULI. See **OBLIQUUS**.

LONGITUDE of a star, in astronomy, an arch of the ecliptic, intercepted between the beginning of aries, and the point of the ecliptic cut by the star's circle of longitude. See the article **CIRCLE**, &c.

LONGITUDE of a place, in geography, is an arch of the equator intercepted between the first meridian, and the meridian passing through the proposed place; which

is always equal to the angle at the pole, formed by the first meridian, and the meridian of the place.

The first meridian may be placed at pleasure, passing through any place, as London, Paris, Teneriff, &c. but among us, is generally fixed at London: and the longitudes counted from it will be either east or west, according as they lie on the east or west side of that meridian. The difference of longitude between two places upon the earth is an arch of the equator comprehended between the two meridians of these places; and the greatest possible is 180° , when the two places lie on opposite meridians.

Since the parallels of latitude always decrease, the nearer they approach the pole; it is plain, a degree upon any of them must be less than a degree upon the equator, in the ratio of the co-sine of the latitude to the radius. Hence, as the radius is to the co-sine of any latitude; so is the minutes of difference of longitude between two meridians, or their difference in miles upon the equator, to the distance of these two meridians on the parallel of that latitude, in miles. And, by this theorem, is the following table constructed.

A Table, shewing how many miles answer to a degree of longitude, at every degree of latitude.

| D. L. | Miles | D. L. | Miles | D. L. | Miles | D. L. | Miles |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 59.99 | 24 | 54.81 | 47 | 40.92 | 69 | 21.50 |
| 2 | 59.97 | 25 | 54.38 | 48 | 40.15 | 70 | 20.52 |
| 3 | 59.92 | 26 | 53.93 | 49 | 39.36 | 71 | 19.54 |
| 4 | 59.86 | 27 | 53.46 | 50 | 38.57 | 72 | 18.55 |
| 5 | 59.77 | 28 | 52.97 | 51 | 37.76 | 73 | 17.54 |
| 6 | 59.67 | 29 | 52.47 | 52 | 36.94 | 74 | 16.53 |
| 7 | 59.56 | 30 | 51.96 | 53 | 36.11 | 75 | 15.52 |
| 8 | 59.42 | 31 | 51.43 | 54 | 35.27 | 76 | 14.51 |
| 9 | 59.26 | 32 | 50.88 | 55 | 34.41 | 77 | 13.50 |
| 10 | 59.08 | 33 | 50.32 | 56 | 33.55 | 78 | 12.48 |
| 11 | 58.89 | 34 | 49.74 | 57 | 32.68 | 79 | 11.45 |
| 12 | 58.68 | 35 | 49.15 | 58 | 31.79 | 80 | 10.42 |
| 13 | 58.46 | 36 | 48.54 | 59 | 30.90 | 81 | 9.38 |
| 14 | 58.22 | 37 | 47.92 | 60 | 30.00 | 82 | 8.35 |
| 15 | 57.95 | 38 | 47.28 | 61 | 29.09 | 83 | 7.32 |
| 16 | 57.67 | 39 | 46.62 | 62 | 28.17 | 84 | 6.28 |
| 17 | 57.37 | 40 | 45.95 | 63 | 27.24 | 85 | 5.23 |
| 18 | 57.06 | 41 | 45.28 | 64 | 26.30 | 86 | 4.18 |
| 19 | 56.73 | 42 | 44.59 | 65 | 25.36 | 87 | 3.14 |
| 20 | 56.38 | 43 | 43.88 | 66 | 24.41 | 88 | 2.09 |
| 21 | 56.01 | 44 | 43.16 | 67 | 23.44 | 89 | 1.05 |
| 22 | 55.63 | 45 | 42.43 | 68 | 22.48 | 90 | 0.00 |
| 23 | 55.23 | 46 | 41.68 | | | | |

LONGITUDE, in navigation, the distance of a ship or place, east or west, from another, reckoned in degrees of the equator. As the discovery of a method to find the longitude would render voyages safe and expeditious, and also preserve ships and the lives of men, the following rewards have been offered by act of parliament, as an encouragement to any person who shall discover a proper method for finding it out: the author or authors of any such method, shall be entitled to the sum of 10,000 l. if it determines the longitude to one degree of a great circle; to 15,000 l. if it determines the same to two-thirds of that distance; and to 20,000 l. if it determines the same to one-half of the same distance; and that half of the reward shall be due and paid when the commissioners of the navy, or the major part of them, agree that any such method extends to the security of ships within eighty geographical miles of the shores, which are places of the greatest danger; and the other half, when a ship, by the appointment of the said commissioners, or the major part of them, shall thereby actually sail over the ocean, from Great Britain to any such port in the West Indies, as those commissioners, or the major part of them, shall choose for the experiment, without losing their longitude beyond the limits before-mentioned, The French, Dutch, Spaniards, and other nations, have likewise offered rewards for the same purpose.

Since by the motion of the earth round its axis, every point upon its surface describes the circumference of a circle, or 360° , in twenty-four hours time, it is plain it must describe 15° in one hour, because $\frac{360}{24} = 15$. Hence the difference of longitude may be converted into time, by allowing one hour for every fifteen degrees, and proportionally for minutes: also difference of time may be converted into difference of longitude, by allowing fifteen degrees for every hour, and proportionally for a greater or less time. Consequently by knowing the one, we can easily find the other.

Whatever contrivance, therefore, shews the hours of the day, at the same absolute point of time, in two different places, likewise serves to find the difference of longitude between those places. Now since an eclipse of the moon proceeds from nothing else but an interposition of the earth between her and the sun, by which means she is prevented from

from reflecting the light she would otherwise receive from the sun, the moment that any part of her body begins to be deprived of the solar rays, it is visible to all those people who can see her at the same time; whence if two or more different people, at two or more different places, observe the times when it first began or ended, or note the time when any number of digits was eclipsed, or when the shadow begins to cover or quit any remarkable spot, the difference of those times (if there be any) when compared together, will give the difference of longitude between the places of observation.

The longitudes of places may also be determined from the observations of solar eclipses, but these being incumbered with the considerations of parallaxes, are not near so proper as those of the moon are; and each of these happening but rarely, another excellent expedient has been thought of, and that is the eclipses of jupiter's satellites. See JUPITER.

Now as neither jupiter nor any of his attendants have any native light of their own, but shine with a borrowed light from the sun, it happens that each of these, in every revolution about jupiter, suffers two eclipses, one at their entrance into the shadow, the other at the entrance of their passage behind his body; whence in each revolution of the satellite there are four remarkable appearances, by the observation of any one of which the business may be done, *viz.* one at the entrance into the shadow, and one at the emergence out of it; one at the entrance behind the body, and another at the coming out; but the latter of these, *viz.* the ingress and egress of the satellite, into and from under the body, is not so much regarded by astronomers as the immersion into and out of the shadow, because, in the former, the difficulty of pronouncing the exact time is very great, it requiring, in each observer, eyes equally good and strong, and telescopes equally large; but the observation of the former of these, *viz.* the immersion into, and emergence out of the shadow, is easy and practicable, because the quick motions of the satellites plunge them so quick into the shadow of jupiter, that it is no difficult matter to pronounce, by any telescope by which they may be seen, the exact time of their immersion and emergence, as any one may soon be satisfied, if he will but try the experiment.

Now, inasmuch as each of these happens

at the same moment of absolute time, if two or more persons, in different places, note the time of observation, these, when compared together, will give the difference of longitude between the two places of observation. And, when we consider the great number of these eclipses that happen every year, there being more visible in one year than there are days in it, and, consequently, but few nights when jupiter may be seen, (and which is near eleven months of the year) but that an eclipse of one or other happens, and sometimes two or three in a night; the easiness with which they may be made, there requiring only a telescope of eight or ten feet in length, which may be almost managed with the hand; and the little likelihood there is of mistaking the times of ingress or egress, they being in a manner momentaneous; and lastly, the great exactness to which they would give the difference of longitude, it being certainly as exact as the latitude can at present be taken; it is much to be wondered at, that the more skilful part of our seamen have so long neglected them, and especially in the several ports into which they sail.

Besides these, there is another method equally useful, expeditious, and certain; and that is, the appulses of the moon to certain fixed stars, and their occultations by the interposition of her body; for, the moon finishing her revolution in the space of twenty-seven days, seven hours, forty-three minutes, there are but few clear nights, when the moon does not pass over or so near to some fixed star, that her distance from it, or the time of her visible conjunction with it, may be easily observed by the telescope, and micrometer only; and these when compared together, or with the visible time computed to the meridian of some place when a good theory of the moon shall be obtained, will shew the difference of longitude of those places.

Mr. Flamsteed has given us the places of near 1000 fixed stars, confirmed by several observations; that lie within the zodiac, each of which will be covered by the moon and the rest of the planets, in one revolution of their node; so that scarce one night can happen but some or other of them will be eclipsed, or approached so near unto, as to come within the compass of a telescope, in one place of the earth or other; add to these the eclipses of jupiter's satellites, and it is scarce

scarce possible that any clear night can happen, but the heavens afford us some agreeable phænomenon or other, by which the longitude of any place may be duly ascertained.

In the Philosophical Transactions, n° 1, we have an account of a successful experiment made with two pendulum-watches by major Holmes, in a voyage from the coast of Guinea homewards. This and some other successes encouraged monsieur Huygens so far, that, after he had improved the structure of these watches, he published an account at large for the shewing how and in what manner these watches are to be used in finding the longitude at sea, with directions for adjusting of them and keeping a journal by them; which account the curious reader may see at large in the Philosophical Transactions, n° 47.

The chief objection against pendulum-clocks and watches, is the effects that heat and cold have upon the spring and pendulum, which makes the spring in watches draw stronger at some times than at other times, and causes the pendulum to lengthen and shorten, according as the weather is hotter or colder; but these effects are so regular, that without doubt they may be accounted for. See the article PENDULUM.

But the most ingenious and successful machines for this purpose have been invented by Mr. John Harrison, who, at different times, contrived three different time-pieces for determining the longitude at sea.

The first of Mr. Harrison's machines was tried in May, 1736, when it was put on board a man of war, and by its exact measure of time, in its return from Lisbon, corrected an error of almost a degree and an half in the computations of the reckoning of a ship. In 1739, Mr. Harrison finished his second machine, which, from various experiments made upon it, was sufficiently regular and exact, for finding the longitude of a ship within the nearest limits proposed by parliament. Upon the success of this, Mr. Harrison, in 1741, undertook a still more advantageous machine, which he finished in 1758, when he applied to the commissioners of longitude, for orders to make a trial of that instrument to some part in the West Indies, as directed by the statutes for the discovery of the longitude at sea. In consequence of this

application, Mr. Harrison received orders for his son to proceed from Portsmouth to Jamaica, in one of his majesty's ships of war, with his third instrument, in November 1761; and the commissioners having directed that every requisite step and precaution should be taken, for making, with care, the proper experiments, and ascertaining their accuracy, not only going to Jamaica, but in the return, it appears, from the calculations made from the experiments in going to Jamaica, that the difference between the longitude, as found by the time-piece, and calculated by the observations of the transit of mercury in 1743, at Jamaica and London, is five seconds of time, which, at Jamaica is little more than a geographical mile.

During the voyage, Mr. Harrison's time-piece corrected the ship's reckoning, which sometimes erred about a degree and a half: and in going from Madeira to Jamaica, it also corrected the errors of the log, and shewed the longitude so exactly, that the ship made the island of Desada, and all the other islands, until they arrived at Jamaica, as foretold by the time-piece. At the arrival at Jamaica, the observations for finding the time were made by equal altitudes; and the longitude shewn by the time-piece, being within 5" of time of the longitude shewn by the most accurate observations of mercury, in its transit over the sun, in the year 1743, and with which all the observations at London and Paris, agreeing within 23", amounts to a demonstration, that Mr. Harrison has performed all that is required by the statute of the 12th of queen Anne, to entitle him to the greatest reward mentioned in that act. In returning from Jamaica, the weather was very tempestuous, so that the time-piece was forced to be placed on the counter, to avoid being perpetually exposed to the sea-water, there it suffered continual violent agitations, which, though they necessarily retarded its motion, yet did not occasion any such considerable error, as would have made Mr. Harrison's right to the greatest reward questionable, had it depended on this voyage only, for the time-keeper, in its going and return, lost only 1' 54" and $\frac{1}{2}$, which, in the latitude of Portsmouth, amounts to about eighteen geographical miles, or minutes of a great circle, whereas the act required only that it should

should come within the distance of thirty geographical miles or minutes of a great circle.

Some also propose a method of finding the longitude, by means of a dipping needle. See the article NEEDLE.

For the method of correcting the longitude found by the dead reckoning, see the article RECKONING.

Argument of LONGITUDE. See the article ARGUMENT.

LONGITUDE *of motion*, according to some philosophers, is the distance which the center of any moving body runs through, as it moves on in a right line. See the article MOTION.

LONGITUDINAL, in general, denotes something placed lengthwise: thus some of the fibres of the vessels in the human body are placed longitudinally, others transversely, or across.

LONGUEVILLE, a town of Normandy, in France, twenty miles north of Rouen: east long. $1^{\circ} 10'$, north lat. $49^{\circ} 50'$.

LONGUS, LONG, an epithet given by anatomists to several muscles to distinguish them from others of the same name, which are called breves or short; thus there is the longus cubiti, which arises from the inferior costa of the scapula: the longus colli, which arises from the bodies of the five upper vertebræ of the back, and is inserted into all the vertebræ of the neck; the longus radii, which has its origin from the exterior spine of the humerus, and its termination at the lower end of the radius. See the article MUSCLE.

LONGWY, a town in the dutchy of Lorraine, ten miles south-west of Luxemburg: east long. $5^{\circ} 25'$, north lat. $49^{\circ} 38'$.

LONICERA, HONEY-SUCKLE, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of a single petal, the tube is oblong and gibbose downwards; the limb is divided into five segments, one of which is more deeply serrated than the rest: the fruit is a roundish umbilicated berry, containing two cells; the seeds are roundish and compressed.

LONSDALE, a market-town of Westmoreland, 25 miles south of Appleby.

LOO, a town of Guelderland in the United Provinces, eight miles west of Deventer.

LOO, or LANTER LOO, a game at cards. See the article LANTER-LOO.

LOOF, in the sea-language, is a term used in various senses; thus the loof of a ship is that part of her aloft, which lies just

before the chest-tree; hence the guns which lie there are called loof-pieces: keep your loof, signifies, keep the ship near to the wind; to loof into a harbour, is to sail into it close by the wind: loof up, is to keep nearer the wind: to spring the loof, is when a ship that was going large before the wind, is brought close by the wind.

LOOF-TACKLE, is a tackle in a ship which serves to lift goods or small weight in or out of her.

LOOKING-GLASSES, are nothing but plane mirrors of glass; which being impervious to the light, reflect the images of things placed before them; for the theory whereof see the articles MIRROR and REFLECTION.

For the casting, grinding, and polishing of looking glasses, see the article GLASS. For foliating of looking-glasses, see the article FOLIATING.

LOOM, a frame composed of a variety of parts, used in all the branches of weaving; for a particular description of which, see the article WEAVING.

LOOM, in the sea-language: when a ship appears big, when seen at a distance, they say she looms.

LOOM-GALE, a gentle easy gale of wind, in which a ship can carry her top sails a-trip.

LOON, in ornithology, the english name of several species of the colymbus, or diver kind. See the article COLYMBUS.

LOOP, in the iron works, denotes a part of a sow, or block of cast iron, broken or melted off from the rest.

LOOP-HOLES, in a ship, are holes made in the coamings of the hatches of a ship, and in their bulk-heads, to fire muskets through, in a close fight.

LOPHIUS, in zoology, a genus of the branchiostegious order of fishes, whose head is in size equal to all the rest of the body: the head and body are both of a depressed form: there are a number of fleshy pinnules, or appendages surrounding the whole body of the fish.

Of this fish there is only one genus, commonly known by the name of rana piscatrix. See the article RANA.

LOPPING, among gardeners, the cutting off the side-branches of trees.

It is observable, says Mr. Miller, that most old trees, as ash, elm, hornbeam, &c. are hollow within, which does not proceed from the nature of the trees, but in their being suffered to grow large before they are lopped. The lopping of young

young trees of ten or twelve years old, at most, will preserve them much longer, and will occasion the shoots to grow more into wood in one year, than they do in old tops at two or three. Great boughs ill taken off, are very prejudicial to trees, for which reason they should always be taken off close and smooth, and not parallel to the horizon; and the wound should be covered with a mixture of loam and horse-dung, to prevent the wet from entering the body of the tree: however, no trees should be lopped but pollard-trees, for nothing is more injurious to the growth of timber-trees, than lopping off great branches from them. All sorts of resinous trees, or such as abound with a milky juice, should be lopped sparingly; for they are subject to decay when often cut. The best season for lopping these trees is soon after Bartholomew-tide; at which time they seldom bleed much, and the wound is commonly healed over before the cold weather comes on.

LOQUABYR, or **LOCHABAR**, a part of the county of Inverness, in Scotland, so called. See the article **INVERNESS**.

LORA, the name of two towns in Spain, one in the province of Granada, and the other in Andalusia.

LORA, also the name of a town of Germany, in the circle of Upper Saxony, thirty miles north of Saxe-Gotha.

LORANTHUS, in botany, a genus of the hexandria-monogynia class of plants; the corolla whereof is formed of a single petal of a sexangular figure, and divided into six nearly equal, linear, revolute segments; the fruit is a roundish unilocular berry; the seeds are six, convex on one side and angular on the other.

LORCA, a town of Spain, in the province of Murcia, thirty-five miles west of Carthagen.

LORD, a title of honour, given to those who are noble, either by birth or creation; in this sense it amounts to much the same as peer of the realm, or lord of Parliament. This title is, by the courtesy of England, also given to all the sons of dukes and marquises, and to the eldest sons of earls: and it is also a title of honour bestowed on those who are honourable by their employments, as lord advocate, lord chamberlain, lord chancellor, &c. See the articles *Lord ADVOCATE*, *Lord CHAMBERLAIN*, *Lord high CHANCELLOR*, &c.

Lord in law, is a title given to a person

who has a fee, and consequently the homage of tenants within his manor. These lords are divided into lords mesne, and lords paramount. See the articles **HOMAGE**, **MESNE**, and **PARAMOUNT**. **LOREDO**, a town of Italy, in the Polasine de Rovigo, and territory of Venice, situated on the river Adige, twenty miles east of Rovigo.

LORETTO, a city of Italy, in the marquise of Ancona, in the pope's territories, 145 miles east of Rome. This place is famous for the chamber of the blessed Virgin, which, according to the roman catholic tradition, was brought by angels from Palestine to Dalmatia, and from thence transported over into Italy, and fixed at Loretto.

LORICATION, **COATING**, in chemistry, is the covering a glass or earthen vessel with a coat or crust of a matter able to resist the heat, to prevent its breaking in the performing an operation that requires great violence of fire.

When vessels are exposed naked to the greatest fire, it easily happens that they burst by throwing fresh cold fuel into the fire, for the preventing of which, the operator must have recourse to lorication, or coating. This is performed in the following manner: take some of the same matter of which the muffles and crucibles are made, and instead of water moisten it with fresh blood not yet coagulated, and diluted with twice, or thrice the same quantity of water, to make a thin paste of it, then add to this paste cow's hairs, or other hairs, not very long nor stiff, and if you have at hand glass pulverized and sifted, it may also be of service to mix some of it with the rest, then with this mass besmear your vessel with a pencil, and dry it; when dried, besmear it a second time, and dry it again; repeat this a third and fourth time, till the vessel be covered over with a crust or coat, one third or fourth part of an inch. See the article **CRUCIBLE**.

LORN, the north part of Argyleshire in Scotland, bounded by Lochabar on the north; by Broadalbin on the east; by the rest of Argyleshire on the south; and by the sea on the west.

LORRAIN, a dutchy formerly belonging to the circle of the Upper Rhine in Germany, but now united to the crown of France. It is bounded by the dutchy of Luxemburg on the north; by Alsacia, the dutchy of Deux Ponts, and the Palatinate

latitude of the Rhine, on the east; by the county of Burgundy, on the south; and by Champaign, on the west.

LOT, *sors*, a portion, share, or part of a thing, parcel of goods, or cargo, divided into many; also the condition, chance, or fortune of a person. See the article **SORTILEGE**.

LOT and SCOT. See the article **SCOT**.

LOT, or LOTH, in mining, the thirteenth dish, measure, or part of the miner's ore, which the bar master takes up for the king, or the farmer.

LOTHIAN, a county of Scotland, bounded by the firth of Forth on the north; by the German Sea, on the east; by Clydesdale, Tweeddale and Merse, on the south; and by Stirling, on the west. The capital of this county is Edinburgh.

LOTION, *lotio*, in medicine and pharmacy, is, strictly speaking, such washing as concerns beautifying the skin, by cleansing it of those deformities which a distempered blood sometimes throws upon it, or rather are made by a preternatural secretion: for according to Quincy, generally those distempers of the skin commonly accounted signs of a foul blood, are from those salts which are natural in the best constitution, thrown off by the cutaneous glands, which ought to be washed away through the kidneys; so that instead of those insignificant and ridiculous tribes of sweeteners, which in this case are frequently used, promoting the urinary discharge, or rectifying that of the skin by proper washes, frictions, or ointments, or both together, is the only way to get rid of such disorders: under this division we shall therefore give such examples of what is proper for this purpose, though many mix herewith such as are more suitable for fomentation. See the article **FOMENTATION**.

To make a repelling lotion: take litharge of gold, four ounces; white wine vinegar, half a pound; digest them together three days, stirring it often, and then filtre for use. This is proper in tetterous eruptions and pimples, which with heat are apt to break out upon the skin; but it is not to be used in critical breakings out, which are by no means to be drove back, but rather encouraged. See the article **ERUPTION**.

To make a stronger repelling lotion: take common white vitriol, an ounce; crude alum, two drams; boil them in twelve ounces of spring-water to eight ounces; take off the scum, and put the

liquor up for use. This must be boiled in an iron vessel, because it is so penetrating as to run through any other. It may be diluted with rose-water, so as to make a good collyrium. The use of this is yet more mischievous than the former, if due care be not taken: therefore some other emunctory must be in readiness to discharge what is lessened by the application of this medicine.

To make an oily lotion for smoothing and softening the skin, and deterging or repelling the humours which deform it, but chiefly to cleanse away freckles and morpew: take oil of tartar per deliquium, an ounce; oil of sweet almonds, two drams; rose-water, four ounces, shake them together.

LOTTERY, a kind of public game at hazard, frequent in Britain, France, and Holland, in order to raise money for the service of the state; being appointed with us by the authority of parliament, and managed by commissioners appointed by the lords of the treasury for that purpose. It consists of several numbers of blanks and prizes, which are drawn out of wheels, one of which contains the numbers, and the other the corresponding blanks or prizes. In order to suppress private lotteries, it is ordained that no person shall put up any office for the sale of any house, lands, or goods, &c. or expose the same to sale by way of lottery, lots, tickets, or numbers, nor shall they publish any proposal relating thereto under the penalty of 500 l. and likewise the adventurers in such sales shall forfeit double the sum they had contributed. Any person who shall sell or deliver any ticket in any foreign lottery, shall upon conviction of that offence, forfeit 200 l. A yearly sum of 24,000 l. out of the additional duties on stamped vellum, parchment, and paper, shall be a fund for annuities of three per cent, to contributors in a lottery until redemption by parliament, and shall be paid half yearly at Christmas and Midsummer to the cashier of the bank. See the articles **CHANCE**, **GAMING**, &c.

LOTUS, the **SQUARE-PODDED VETCH**, in botany, a genus of the diadelphiadecandria class of plants, the corolla whereof is papilionaceous, the vexillum is roundish, and bent back, with an oblong concave unguis; the alæ are roundish, and shorter than the vexillum; the carina is gibbous underneath, and shut above: the fruit is a cylindric pod, consisting

sisting of two valves, and containing two cells: the seeds are numerous and roundish.

LOVAGE, in botany, the english name for the ligusticum. See **LIGUSTICUM**.

LOUDAN, a town of France, in the province of Orleanois, and territory of Poictou, situated twenty-five miles north of Poictiers.

LOVE APPLE, the fruit of a species of solanum, a plant cultivated in gardens among us for the singularity of its appearance: the Portuguese eat this fruit either raw or stewed, as do also the jew-families in England.

LOVENDEGEN, a fortress in the Austrian Netherlands, in the province of Flanders, situated on the canal between Ghent and Bruges, five miles west from Ghent.

LOUGHBOROUGH, a market-town in Leicestershire, situated ten miles north of Leicester.

LOUIS, or *Knights of St. Louis*, the name of a military order in France instituted by Louis XIV. in 1693. Their collars are of a flame-colour, and pass from left to right; the king is their grand master. There are in it eight great crosses, and twenty-four commanders; the number of knights is not limited. At the time of their institution, the king charged his revenue with a fund of three hundred thousand livres for the pensions of the commanders and knights. See the crosses worn by these knights, represented in plate **CLXII.** fig. 5.

LOUIS, LEWIS, LOUIS D'OR, or LEWIS-DORE, a french coin. See **COIN**.

LOUISIANA, or NEW FRANCE, a country of north America, bounded with the river and lake of Illenois, on the north; North Carolina, on the east, and the gulph of Mexico on the south.

LOUITS, a town of Great Poland, in the palatinate of Rava, sixty-five miles east of Gnesna.

LOUREBRANDER, a town of hither India, at the mouth of the river Indus, in east long. 67°, north lat. 25°.

LOUSE, *pediculus*, in zoology. See the article **PEDICULUS**.

LOUTH, a county of Ireland, in the province of Leinster, bounded by Monaghan and Armagh on the north; by the Irish Channel, on the east; by East Meath, on the south; and by Cavan, on the west.

LOUTH, a market-town of Lincolnshire, twenty-four miles north-east of Lincoln.

LOUVAIN, a city of the Austrian Ne-

therlands, in the province of Brabant, situated on the river Dyle, fifteen miles north-east of Brussels.

LOUVESTEIN, a fortress of the United Provinces, situated in the province of Holland, at the confluence of the rivers Waal and Maes, sixteen miles east of Dort.

LOUVO, a city of Siam, in the farther India, situated in east long. 101°, north lat. 15°.

LOW-BELLS, or LOW-BELLERS, in our statute-book, are persons who go in the night-time with a light and a bell, by the sight and noise whereof birds, sitting on the ground, become stupified, and so are covered with a net and taken.

LOWERING, among distillers, a term used to express the debasing the strength of any spirituous liquors, by mixing water with it. The standard and marketable price of these liquors is fixed in regard to a certain strength in them called proof; this is that strength which makes them when shook in a vial, or poured from on high into a glass, retain a froth or crown of bubbles for some time. In this state, spirits consist of about half pure or totally inflammable spirit, and half water; and if any foreign or home spirits are to be exposed to sale, and are found to have that proof wanting, scarce any body will buy it till it has been distilled again and brought to that strength; and if it is above that strength, the proprietor usually adds water to it to bring it down to that standard. See the article **PROOF**.

There is another kind of lowering among the retailers of spirituous liquors to the vulgar, by reducing it under the standard-proof: whoever has the art of doing this without destroying the bubble proof, which is easily done by means of some addition that gives a greater tenacity to the parts of the spirits, will deceive all that judge by this proof alone. In this case, the best way to judge of liquors is by the eye and tongue, and especially by the instrument called hydrometer. See the article **HYDROMETER**.

LOXA, a city of Peru, 200 miles east of Payta: west long. 77°, south lat. 5°.

LOXIA, in the linnæan system of zoology, the name of a genus of birds of the order of the passerres; the distinguishing characters of which are, that the tongue is plain, equal and whole, the beak large, thick, and short, and crooked and convex both ways.

Of this genus is the cross-bill, called in some places the shell-apple, supposed to be the tragon of the antients. It is about the size of the green-finch, and much of the same shape. It has a forked tail, and the chaps of its bill are so bent, that the points cross one another; whence the name. See plate CLXIV. fig. 1.

LOXODROMICS, the art of oblique sailing. See the article SAILING.

LOYA, a town of Spain, in the province of Granada, twenty-five miles west of the city of Granada.

LOZENGE, LOZANGE, *rhombus*, in geometry, a quadrilateral figure, consisting of four equal and parallel sides, two of whose opposite angles are acute, and the other two obtuse: the distance between the two obtuse ones being always equal to the length of one side; when the sides are unequal, the figure is called a rhomboides.

LOZENGE, in heraldry, a rhombus, or figure of equal sides, but unequal angles, resembling a quarry of glass in our old windows, placed erect, point-ways. It is in this figure, that all unmarried gentlewomen and widows bear their coats of arms, because, as some say, it was the figure of the amazonian shield; or as others, because it is the antient figure of the spindle. Plate CLXII. fig. 6. represents an ordinary of lozenges.

The lozenge differs from the fusil, in that the latter is narrower in the middle, and not so sharp at the ends.

LOZENGE, in pharmacy, the same with what is otherwise call troche. See the article TROCHE.

LUBAN, a town of Livonia, seventy miles east of Riga, subject to Russia.

LUBEC, a city and port-town of Germany, in the circle of Lower Saxony, and dutchy of Holstein, situated ten miles south-west of the Baltic sea: east long. $10^{\circ} 35'$, north lat. $54^{\circ} 20'$.

LUBEN, a town of Germany, in the circle of Upper Saxony, and marquisate of Lusatia: east longitude $14^{\circ} 25'$, north latitude 52° .

LUBEN, a town of Bohemia, in the province of Silesia, twenty-two miles north-west of Breslaw.

LUBLIN, a city of Poland, in the palatinate of the same name: east long. $22^{\circ} 15'$, north lat. $51^{\circ} 30'$.

LUBOW, a town of Poland, in the palatinate of Cracow: east long. $20^{\circ} 30'$, north lat. $49^{\circ} 30'$.

LUC, a town of Provence, in France,

twenty-three miles north-east of Toulon. LUC, is also a town of France, in the province of Dauphine, thirty-two miles south of Grenoble.

LUCAR, or St. LUCAR, a port-town of Spain, in the province of Andalusia: west long. $6^{\circ} 38'$, north lat. $36^{\circ} 42'$.

St. LUCAR is also a town of Andalusia, in Spain: west longitude $8^{\circ} 12'$, north latitude $37^{\circ} 20'$.

St. LUCAR is also the name of another town of Spain, fifteen miles west of Seville.

LUCARNO, a town of the dutchy of Milan, situated on the lake of Maggiore, but subject to Switzerland.

LUCAYA, or BAHAMA-ISLANDS. See the article BAHAMA.

LUCCA, the capital of the republic of the same name in Italy, situated twelve miles east of the Tuscan sea: east longitude $11^{\circ} 20'$, north latitude $43^{\circ} 45'$.

The territory of this small republic is about twenty-five miles long, and twenty broad, and the ordinary revenues of the state about 30,000 l. *per annum*.

LUCERA, a town of Italy, in the kingdom of Naples, and territory of the Capitate: east longitude $16^{\circ} 6'$, north latitude $41^{\circ} 20'$.

LUCERN, the capital of the canton of the same name in Switzerland, situated on the lake Lucern, to which it gives its name: east long. $8^{\circ} 12'$, north lat. 47° . It stands on a plain almost surrounded with mountains. The canton itself, which is inhabited by papists, is about fifty miles long, and thirty broad.

LUCERNA, a town of Italy, in the territory of Piedmont, fifteen miles south of Turin.

LUCERNA, in ichthyology, a name given to a fish more commonly known by that of uranoscopus. See URANOSCOPUS.

LUCERNE, in botany, &c. a plant frequently cultivated in the manner of clover, and known among authors by the names of medica and medicago. See the article MEDICAGO.

The leaves of this plant grow three at a joint, like those of clover; its stalks are erect, and after mowing, immediately spring up again from the stubble or cut stumps. It is made into hay in the same manner as saint-foin, but should be mowed before it flowers: it makes the sweetest and most fattening food in the world for cattle; but must be given with caution, otherwise it will cause them to swell. See the article HAY.

LUCHEN, a town of Spain, in the province

of Valencia, thirty miles south of the city of Valencia.

LUCIA-ISLANDS, one of the Caribbee-islands in America, situated seventy miles north-west of Barbadoes, being twenty-two miles long, and eleven broad.

St. LUCIA, one of the Cape Verd islands in Africa, lying in west long. 25° , north lat. $16^{\circ} 30'$.

LUCID INTERVALS, in lunatics, the times wherein they appear to be in their senses. See the article **LUNATIC**.

LUCIDA, in astronomy, an appellation given to several fixed stars on account of their superior brightness; as the lucida coronæ, a star of the second magnitude, in the northern crown; the lucida hydræ, or cor hydræ; and the lucida lyræ, a star of the first magnitude, in that constellation.

LUCIGNANO, a town of Italy, in the duchy of Tuscany, situated in east long. $12^{\circ} 35'$, north lat. $43^{\circ} 10'$.

LUCIOPERCA, the **PIKE-PEARCH**, or **BRASSE**, in ichthyology, a species of perch, with two large teeth on each side. It grows frequently to two feet in length; its head is large, and compressed; its breast flat; and the belly convex, as is the back; and the fins are situated as represented in plate **CLXIII.** fig. 1.

LUCIUS, the **PIKE**, or **JACK**, in ichthyology, a species of esox, with a depressed rostrum. See the article **ESOX**.

The pike grows to a considerable size, but usually is found from fourteen inches to two feet in length: it is all over variegated with round yellowish spots. It is a well known and very voracious fish. See plate **CLXIII.** fig. 2.

For the method of fishing it, see the articles **FISHING** and **HUXING**.

LUCIUS MARINUS, the name of two fishes, otherwise called hake and *sphyræna*.

LUCON, a town of France, in the territory of Poitou, situated fifteen miles north of Rochelle.

LUCONIA, or **MANILLA**, the chief of the Philippine islands, situated between 117° and 123° east long. and between 12° and 19° of north lat.

LUDLOW, a borough of Shropshire, situated on the river Corve, eighteen miles south of Shrewsbury. It sends two members to parliament.

LUDUS HELMONTII, in natural history, a name given to the septaria with sparry partitions. See **SEPTARIA**.

LUDWIGIA, in botany, a genus of the tetralia-monogynia class of plants, the

corolla whereof consists of four plane, patent, equal petals; of an obversely cordated figure: the fruit is a quadrangular obtuse capsule, surrounded with the cup, and coronated with it at the extremity: it consists of four cells, and opens in four places at once: the seeds are numerous and small.

LUES, among physicians, is, in general, used for a disease of any kind; but, in a more particular sense, is restrained to contagious and pestilential diseases: thus the lues gallica, or venerea, signifies the venereal disease. See the article **POX**, &c.

LUFF, or **LOOF**, in the sea language. See the article **LOOF**.

LUG, a river of Wales, which passes by Monmouth, and falls into the Severn at Chepstow.

LUGANO, a town of Italy, in the duchy of Milan, situated on the lake Lugano, twenty miles north-west of Como.

LUGGERSHAL, a borough-town, ten miles north of Salisbury. It sends two members to parliament.

LUGO, a city and bishop's see of Spain, sixty miles east of Compostella: west long. $7^{\circ} 50'$, and north lat. $43^{\circ} 5'$.

LUKE, or *gospel of St. LUKE*, a canonical book of the New Testament.

Some think it was properly St. Paul's gospel, and that when that apostle speaks of his gospel, he means what is called St. Luke's. Irenæus says, that St. Luke digested into writing what St. Paul preached to the gentiles; and Gregory Nazianzen tells us, that St. Luke wrote with the assistance of St. Paul.

“ St. Luke, says a modern writer, is
“ pure, copious, and flowing in his lan-
“ guage, and has a wonderful and en-
“ tertaining variety of select circum-
“ stances in his narration of our Savi-
“ our's divine actions. He acquaints us
“ with numerous passages of the evan-
“ gelical history, not related by any other
“ evangelist; both in his gospel and apo-
“ stolical acts, he is accurate and neat,
“ clear and flowing, with a natural and
“ easy grace: his style is admirably ac-
“ commodated to the design of his his-
“ tory; it had a good deal of resem-
“ blance to that of his great master St.
“ Paul; and like him, he had a learn'd
“ and liberal education. I believe he
“ had been very conversant with the best
“ classics; for many of his words and
“ expressions are exactly parallel to
“ theirs.” *Blackwall's Sacred Glosses.*

St. LUKE *the evangelist's day*, a festival in the christian church, observed on the 18th of October.

LULA, a town of swedish Lapland, situated at the mouth of the river of the same name, on the west side of the Bothnic gulph: east longitude 21° , north latitude $64^{\circ} 30'$.

LULA LAPMARK, a province of Sweden, bounded on the north by that of Torne; on the east, by the Bothnic gulph; on the south, by Pithia-lapmark; and on the west, by Norway.

LUMBAGO, in medicine, denotes a pain about the loins, as that preceding fevers, agues, and rheumatism. See the articles **FEVER**, **AGUE**, and **RHEUMATISM**.

LUMBARIS, a name given to the arteries and veins which spread over the loins; or an epithet to distinguish those branches of the aorta which carry the blood to the muscles of the loins, to those of the abdomen, and other of the circumjacent parts, and also to certain veins which bring back the blood from the loins into the trunk of the vena cava.

LUMBRICAL, a name given to four muscles of the fingers, and to as many of the toes. They are in each called the flexors of the first phalanx; those of the fingers arise deep and tendinous, and are inserted into the first phalanges on the side next the thumb: those of the toes have their origin from the tendon of the musculus perforans, and from the interior part of the calcaneum: their termination is at the first phalanx of the several toes.

LUMBRICUS, the **EARTH-WORM**, in zoology. See the article **WORMS**.

LUMME, in ornithology, a species of colymbus, with palmated undivided feet. See the article **COLYMBUS**.

This is a very beautiful bird, and is extremely common in some particular parts of the north of Europe, though wholly unknown elsewhere: it is about equal to our common wild-duck in size; the head is large, and rounded at the sides, but somewhat depressed on the crown; the eyes are large, sharp, and piercing, and their iris of a fine pale hazel; the beak is about an inch and three quarters in length, and towards the base pretty thick, and of a deep glossy black; as are also the legs, which are very robust; the head and neck are grey; the back and wings black, but beautifully variegated with square spots of white; and the breast and belly are white.

LUMP-FISH, *cyclopterus*. See the article **CYCLOPTERUS**.

LUNA, in astronomy, the moon. See the article **MOON**.

LUNA, among chemists, signifies silver. See the article **SILVER**.

LUNAR, something belonging to the moon; thus we say lunar month, lunar year, lunar dial, lunar eclipse, &c. See **MOON**, **MONTH**, **YEAR**, &c.

LUNARIA, **HONESTY**, in botany, a genus of the tetradynamia-filiculosa class of plants; the corolla whereof consists of four cruciform, entire, obtuse, large petals of the length of the cup, and ending in unguis of the same length; the fruit consists of an elliptic, plano-compressed, erect, and very large pod, standing upon a pedicle, terminated by a style, consisting of two valves, and containing two cells; the seeds are few, kidney shaped, compressed, marginated, and placed in the middle of the pod.

This plant is famous in some parts of the kingdom for its medicinal virtues, though it has not the fortune to be received in the shops. The people in the northern countries dry the whole plant in the oven, and give as much as will lie on a shilling for a dose, twice a day, in hæmorrhages of all kinds, particularly in the too abundant flowing of the menses, and this with great success. The Welsh, among whom it is not uncommon, Dr. Needham informs us, make an ointment of it, which they use externally, and pretend it cures dysenteries.

LUNATIC, a person affected with lunacy, the cure of which is to be attempted by evacuations of all kinds; as bleeding, vomiting, cathartics, &c. See **MADNESS**. A lunatic is defined by our lawyers to be a person who is sometimes of a sound mind, and at other times not so; in which last case, he is said to be *non compos mentis*. A lunatic, while in this state, is not chargeable with any criminal act, except an attempt upon the person of the king; and, therefore, where a person incites a lunatic to commit a criminal action, he is, in the eye of the law, a principal offender, and is punished in the same manner as if he committed it himself. But tho' a lunatic is not punishable, yet to prevent mischief, he may be confined in prison till he has recovered his senses. Lunatics or madmen, that wander about, may be apprehended by a justice's warrant, locked up, and chained, if necessary; or sent to their legal settlement,

ment, and two justices of peace may charge their estates for their maintenance. Commissions of lunacy are issued out of chancery, empowering the commissioners to examine whether a person be a lunatic, and also to make inquest of his lands, &c. But in such case, tho' lands are seized by the king upon a commission of lunacy and he grants the custody of the lunatic, *sine computo reddendo*, that is, without an account to be rendered; yet if the lunatic becomes afterwards of a sound memory, he may have an action of account for the profits. It is ordained, that the king shall provide that the lands of a lunatic be safely kept, that he and his family be maintained out of the profits, and the residue delivered to him when he comes to his right mind, the king taking nothing to himself: any deed or contract made by a lunatic, may be set aside by his next heir, but not by himself; yet where a lunatic has purchased, if he recover his memory, he may agree to it, after which his heirs cannot disagree to it.

LUND, or **LUNDEN**, a city of Sweden, in the province of Gothland, the capital of the territory of Schonen, situated thirty miles east of Copenhagen.

LUNDEN, a town of Germany, in the circle of Lower Saxony, and dutchy of Holstein: east long. $8^{\circ} 45'$, north lat. $54^{\circ} 45'$.

LUNDY, a little island in the mouth of the Bristol-channel: west long. $4^{\circ} 50'$, north lat. $51^{\circ} 25'$.

LUNENBURG, the capital of the dutchy of the same name, thirty miles south-east of Hamburg: east long. $10^{\circ} 20'$, north lat. $53^{\circ} 35'$.

LUNGS, a part of the human body, which is the cause or instrument of respiration. The lungs are the largest viscus of the thorax: they are situated in the two sides of it, with the heart as it were between them; and are connected by means of the mediastinum, with the sternum and vertebræ; with the heart, by means of the pulmonary vessels, and immediately with the aspera arteria. The colour of the lungs, in infants, is a fine florid red; in adults, it is darker; and in old people, livid, or variegated with black and white. When inflated, they have some resemblance to the hoof of an ox; and are convex on the upper side, and concave underneath. They are divided into two large lobes, the right and left; the left, which is the smaller, is divided again into two; and the right, which is larger, into

three smaller ones. The membrane with which the lungs are surrounded, is continuous with the pleura. The substance of the lungs is spongy, or vesiculous, and they seem, indeed, entirely composed of a number of small vesicles of a fleshy texture, and of a variety of vessels.

The vessels of the lungs are the bronchia, the bronchial artery and vein, the pulmonary artery and vein, the nerves, and the lymphatics. See **BRONCHIA**, &c.

The uses of the lungs are, 1. To perform the office of respiration, by which the blood is attenuated in the plexus of the arteries called the rete vasculosum. 2. To be assistant to the voice in speaking, and to the sense of smelling. They are also emunctories of the blood, and are of many other important services.

To give a more distinct idea of the form of the lungs and their situation, with respect to the parts to which they are united, we have given a plate of them, in which they are represented in two different views, see plate **CLXIV**. fig. 2. where, in n^o 1. A is the larynx; B, the aspera arteria, or wind-pipe; CC, the lungs; D, the thymus; EE, two branches of nerves passing to, FFF, the diaphragm. In n^o 2. A is also the larynx; B, the aspera arteria; CCCCC, the lobes of the lungs; D, the heart inclosed in the pericardium; E, the vena cava superior; F, the subclavian and carotid arteries.

For the diseases in the lungs, see the articles **ASTHMA**, **CONSUMPTION**, **PERIPNEUMONY**, &c.

LUNG-WORT, *pulmonaria*, in botany. See the article **PULMONARIA**.

LUNISOLAR YEAR, in chronology, the space of 532 common years; found by multiplying the cycle of the sun by that of the moon. See **CYCLE** and **YEAR**.

LUNULA, in geometry, a plane figure like a crescent, or half-moon, for the quadrature of which, see **QUADRATURE**.

LUPERCALIA, a festival of the ancient Romans in honour of the god Pan, observed on the 15th of February, and so called from luperci, the priests of that fabulous diety. This festival was instituted by Evander, who being driven from Arcadia, and received by king Faunus, introduced the worship of Pan in Italy: but the ceremonies and magnificence of this feast were increased by Romulus. At this festival the luperci ran naked about the city, striking those they met with

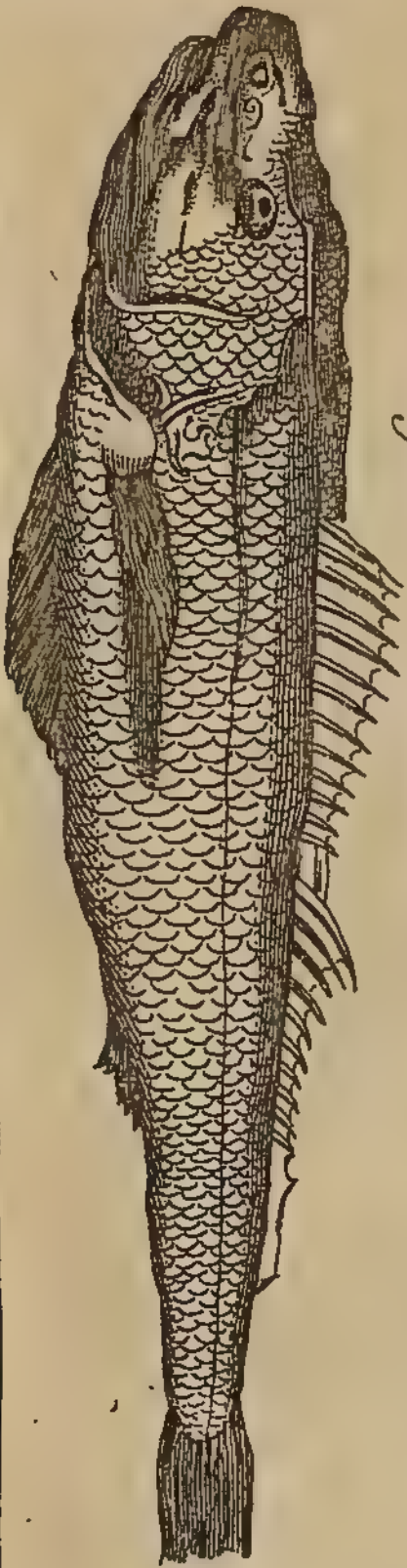


Fig. 1. LUCIOPERCA.



Fig. 2. LUCIUS the PIKE or JACK.

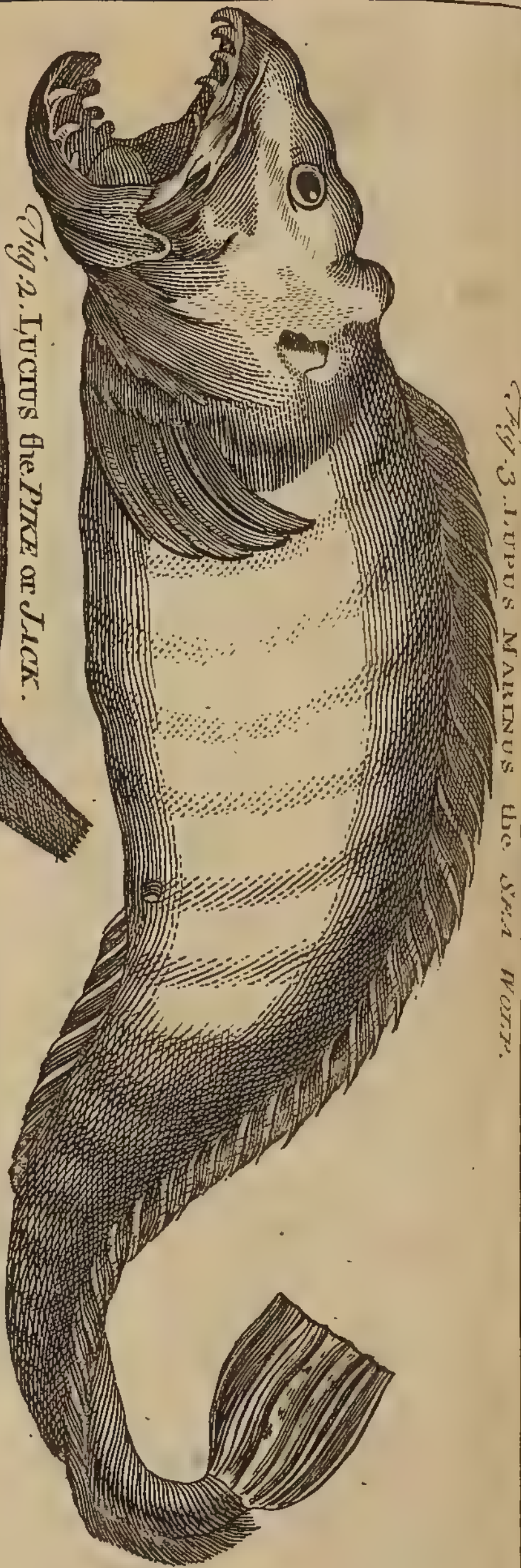
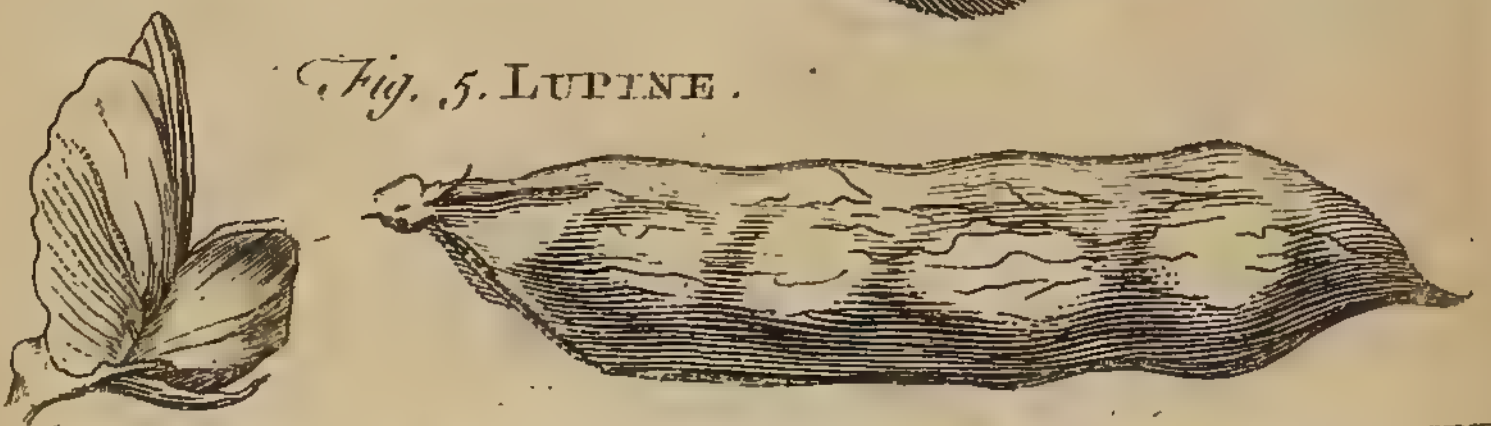


Fig. 3. LUPUS MARINUS the SEA WOLF.

Fig. 4. LYCHNIS.



Fig. 5. LUPINE.



with thongs cut out of the skins of goats: the women foolishly imagined that their receiving the sacred stroke helped-conception, and rendered their delivery more easy. Cicero, after speaking with contempt of the luperci, in his second Philippic, ridicules Anthony for running about as a lupercus. Nevertheless we find that magistrates and persons of noble birth, were not ashamed to act so ridiculous a part in the sight of all the citizens.

LUPIA, in surgery, a kind of encysted tumour, called also *talpa* and *testudo*. See *Encysted Tumours*.

LUPINE, *lupinus*, in botany, a genus of the diadelphia-decandria class of plants, the corolla whereof is papilionaceous; the vexillum is cordated, roundish, and emarginated: the alæ are oval, and almost of the same length with the vexillum; the carina is divided into two segments at the base: the fruit is a large, oblong, coriaceous, compressed, acuminate pod, containing only one cell: the seeds are numerous, roundish, and compressed. See plate CLXIII. fig. 5.

LUPULUS, the HOP, in botany, &c. See the article HOP.

LUPUS, the WOLF, in zoology. See the article WOLF.

LUPUS, in ornithology, the same with the monedula, or jackdaw. See JACKDAW.

LUPUS MARINUS, the SEA-WOLF, in ichthyology, constitutes a distinct genus of malacopterygious fishes, with a compressed body, and six or more officles in the membrane of the gills. On the back there is only one fin, which extends almost from the head to the tail. It is a very singular fish, growing to four or five feet long. See plate CLXIII. fig. 3.

This fish is called *anarrichas*, by the generality of authors.

LUPUS, in astronomy, a southern constellation, consisting of nineteen, or, according to Flamsteed, of twenty-four stars.

LURE, in falconry, a device of leather, in the form of a bird, with two wings stuck with feathers, and baited with a piece of flesh; wherewith to reclaim or call back a hawk, when at a considerable distance. See the article FALCONRY.

LURE, in geography, a town of Champagne, in France, thirty-five miles north-east of Besançon.

LUSATIA, a marquisate of Upper Saxony, bounded by Brandenburg, on the north; by Silesia, on the east; by Bohemia, on the south; and by the dutchy

of Saxony, on the west: it is subject to the king of Poland.

LUSCINIA, the NIGHTINGALE, in ornithology. See NIGHTINGALE.

LUSIGNAN, a town of France, fifteen miles south-west of Poitiers, situated under the meridian of London.

LUST, in the sea-language. When a ship heels more one way than another, she is said to have a lust that way.

LUSTRATION, in antiquity, sacrifices or ceremonies by which the antients purified their cities, fields, armies, or people, defiled by any crime or impurity.

Some of these lustrations were public, others private. There were three species or manners of performing lustration, *viz.* by fire and sulphur, by water, and by air, which last was done by fanning and agitating the air round the thing to be purified. Some of these lustrations were necessary, that is, could not be dispensed with, as lustrations of houses in time of a plague, or upon the death of any person: others again were done out of choice, and at pleasure. The public lustrations at Rome were celebrated every fifth year, in which they led a victim thrice round the place to be purified, and in the mean time burnt a great quantity of perfumes. Their country lustrations, which they called *ambarvalia*, were celebrated before they began to reap their corn: in those of the armies, which they called *armilustria*, some chosen soldiers, crowned with laurel, led the victims, which were a cow, a sheep, and a bull, thrice round the army ranged in battle-array in the field of Mars, to which deity the victims were afterwards sacrificed, after pouring out many imprecations on the enemies of the Romans. The lustrations of their flocks were performed in this manner: the shepherd sprinkled them with pure water, and thrice surrounded his sheepfold with a composition of savin, laurel, and brimstone set on fire, and afterwards sacrificed to the goddess Pales an offering of milk boiled, wine, a cake and millet. As for private houses, they were lustrated with water, a fumigation of laurel, juniper, olive-tree, savin, and such like; and the victim commonly was a pig. Lustrations made for particular persons were commonly called expiations, and the victims *piacula*. There were also a kind of lustration used for infants, by which they were purified, girls the third, and boys the ninth day after their birth, which ceremony was performed with

with pure water and spittle. See the article AMBARVALIA.

In their lustratory sacrifices the Athenians sacrificed two men, one for the men of their city, and the other for the women. Divers of these expiations were austere: some fasted, others abstained from all sensual pleasures, and some, as the priests of Cybele, castrated themselves. The postures of the penitents were different, according to the different sacrifices. The priests changed their habits according to the ceremony to be performed; white, purple, and black, were the most usual colours. They cast into the river, or at least out of the city, the animals or other things that had served for a lustration or sacrifice of atonement, and thought themselves threatened with some great misfortune when by chance they trod upon them. Part of these ceremonies were abolished by the emperor Constantine, and his successors; the rest subsisted till the gothic kings were masters of Rome, under whom they expired, excepting what the popes thought proper to adopt and bring into the church.

For the lustration, or rather expiation, of the antient Jews, see EXPIATION.

LUSTRE, the gloss or brightness appearing on any thing, particularly on manufactures of silk, wool, or stuff. It is likewise used to denote the composition or manner of giving that gloss.

The lustre of silks is given them by washing in soap, then clear water, and dipping them in alum water cold. To give stuffs a beautiful lustre, for every eight pounds of stuff allow a quarter of a pound of linseed; boil it half an hour, and then strain it through a cloth, and let it stand till it is turned almost to a jelly: afterwards put an ounce and a half of gum to dissolve twenty-four hours; then mix the liquor, and put the cloth into this mixture; take it out, dry it in the shade, and press it. If once doing is not sufficient, repeat the operation. Curriers give a lustre to black leather first with juice of bar-berries, then with gum-arabic, ale, vinegar, and Flanders-glue, boiled together. For coloured leather, they use the white of an egg beaten in water. Moroccoes have their lustre from juice of bar-berries and lemon or orange. For hats, the lustre is frequently given with common water, sometimes a little black dye is added: the same lustre serves for furs, except that for very black furs they sometimes prepare a lustre of galls, cop-

peras, roman alum, ox's marrow, and other ingredients.

LUSTRUM, in roman antiquity, a general muster and review of all the citizens and their goods, which was performed by the censors every fifth year, who afterwards made a solemn lustration. See the article LUSTRATION.

This custom was first instituted by Servius Tullius, about 180 years after the foundation of Rome. In course of time the lustra were not celebrated so often, for we find the fifth lustrum celebrated at Rome only in the 574th year of that city.

LUSUC, or **LUCKO**, a city and bishop's see of Poland: east long. 25° , and north lat. $51^{\circ} 5'$.

LUTE, or **LUTING**, among chemists, a mixed, tenacious, ductile substance, which grows solid by drying, and being applied to the juncture of vessels, stops them up so as to prevent the air from getting either in or out.

When the subject is merely aqueous, linseed meal ground to fine powder, and well mixt or worked up into a stiff paste with the white of an egg, makes a proper luting for the purpose; for being applied to the junctures of distilling vessels, it grows hard with heat; and if it happens to crack, it is easily repaired by the application of fresh paste, which soon grows solid as before. But a paste made of the same meal, well worked up with cold water, very well answers the end in the distillation of all fermented inflammable spirits, and all volatile alkaline salts; but this paste will not answer in the distillation of mild acids or acetous spirits, because it softens and dissolves therewith, so as to let the fumes escape; in these cases, therefore, a bladder steeped in water till it begins to grow slimy, makes an excellent luting, by being applied and pressed wet upon the junctures of the distilling vessels. A luting that acquires a stony hardness, is necessary in the distillation of the fossil acids, as those of vitriol, sea-salt, &c, which kind of luting is called the philosophical luting, and may be prepared from the calx of copperas and quick-lime, by boiling the caput mortuum of vitriol in several parcels of water till it is thus thoroughly washed from its saline part, then drying the powder, and preserving it in a close vessel. This powder is to be rubbed with an equal quantity of strong quick lime, and wrought into a paste with the whites of eggs first beat thin; and this luting is immediately to be

be applied to the junctures of the vessels, after their first being heated a little.

LUTE, is also a musical instrument with strings.

The lute consists of four parts, *viz.* the table, the body or belly; which has nine or ten sides; the neck, which has nine or ten stops or divisions, marked with strings; and the head, or cross, where the screw for raising and lowering the strings to a proper pitch of tone are fixed. In the middle of the table there is a rose or passage for the sound; there is also a bridge that the strings are fastened to, and a piece of ivory between the head and the neck to which the other extremities of the strings are fitted. In playing, the strings are struck with the right hand, and with the left the stops are pressed. The lutes of Bologna are esteemed the best on account of the wood, which is said to have an uncommon disposition for producing a sweet sound.

LUTHERANS, the christians who follow the opinions of Martin Luther, one of the principal reformers of the church in the sixteenth century.

This sect took its rise from the distaste taken at the indulgences which were granted in 1517, by pope Leo X. to those who contributed towards finishing St. Peter's church at Rome. John Stupitz, vicar-general of the augustines in Germany, was the first who took occasion to declare against these abuses, for which purpose he made use of Martin Luther, the most learned of all the augustines. Luther was a native of Eisleben, in the county of Mansfield in Saxony, and taught divinity at the university of Wirtemberg; he mounted the pulpit, and declaimed vehemently against the abuse of indulgences, and even fixed ninety-five propositions upon the church doors of Wirtemberg, in order to their being considered and examined in a public conference: against these John Tetzel, a dominican, published a hundred and six propositions at Francfort upon the Oder; and by virtue of his office of inquisitor, ordered those of Luther to be burnt: when his adherents, to revenge the affront, publicly burnt at Wirtemberg those of Tetzel. Thus war was declared between the dominicans and augustines, and soon after between the roman catholic and the lutheran party. In 1520, Luther sent his book *De Libertate Christiana*, to the pope; in which he grounds justification upon faith alone, without

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the assistance of good works; and asserts, that christian liberty rescues us from the bondage of human traditions, and particularly the slavery of papal impositions; and afterwards, in a remonstrance written in high Dutch, he proceeded to deny the authority of the church of Rome. He was the same year excommunicated by the pope; upon which Luther causing a large fire to be made without the walls of Wirtemberg, threw the pope's bull into it with his own hands, together with the decretals, extravagants, and clementines; and this example was followed by his disciples in other towns. The next year the emperor Charles V. ordered his books to be burnt, and put him under the ban of the empire as a heretic and schismatic; and about this time king Henry VIII. of England wrote against him in defence of the seven sacraments, to which Luther wrote a reply.

The elector of Saxony, who had for some time kept him concealed in his castle of Wesberg, now gave him leave to reform the churches of Wirtemberg as he thought fit; when this reformer proposed that the bishops, abbots, and monks should be expelled; that all the lands and revenues of the bishoprics, abbies, and monasteries, should escheat to the respective princes; and that all the convents of mendicant friars should be turned into public schools and hospitals: this year, Luther had the satisfaction to see a league contracted between Gustavus king of Sweden, and Frederick king of Denmark, who both agreed to establish lutheranism in their dominions: and now Luther's persuasion, which from the Upper Saxony had spread into the northern provinces, began to be perfectly settled in the duchies of Lunenburg, Brunswick, Mecklenburgh and Pomerania, and in the archbishoprics of Magdeburg and Bremen; in the towns of Hamburg, Wismar, Rostock, and along the Baltic as far as Livonia and Prussia. Luther maintained the doctrine of consubstantiation; and at a general diet at Ratisbon for reconciling both parties, the divines could agree to no more than five or six articles concerning justification, free-will, original sin, baptism, good works, and episcopacy.

LUTHERN, in architecture, a kind of window over the corniche, in the roof of a building; standing perpendicularly over the naked of a wall, and serving to illuminate the upper story.

11. U

Lutheins

Lutherns are of various forms, as square, semi-circular, round, called bulls-eyes, flat arches, &c.

LUTON, a market-town, fourteen miles south of Bedford.

LUTRA, the OTTER, in zoology. See the article OTTER.

LUTTERWORTH, a market-town, twelve miles south of Leicester.

LUTUM, among chemists, denotes a lute; and lutum sapientiæ, the hermetical seal. See LUTE and HERMETICAL.

LUTZEILSTEIN, a town of Germany, seventeen miles north of Strasburg.

LUTZEN, a town of Upper Saxony, in Germany, eight miles west of Leipzig.

LUXATION, *luxatio*, in surgery, is when any bone is moved out of its place, or articulation, so as to impede or destroy its proper motion or office: hence, it appears, that luxations are peculiar to such bones as have moveable joints; but, in a common way of speaking, people term it a luxation, when the bones of the nose are displaced, or when epiphyses are separated from their bones in infants.

Those, therefore, who desire to be fully versed in the knowledge and cure of luxations, should have a clear idea and remembrance of the form of each articulation, with its ligaments and muscles; which can only be obtained by a frequent and diligent inspection of anatomical dissections. See the article ANATOMY. Luxations are generally distinguished into perfect and imperfect: these last are when the bones are only dislocated in part, yet so as that they cannot perform their office; whereas, in perfect luxations, the bones are wholly separated or displaced from their articulation with each other.

As to the method of treating luxations, it is much the same with that used in fractures; for in both cases, the whole design of the surgeon is, 1. To restore the bone to its place, first by extension, and then by reduction with his hands. 2. To preserve and retain what is so replaced, in their natural position. 3. To prevent and cure the several symptoms usually attending them.

To replace a luxated bone, the surgeon ought to regulate the assistant's extension, by ordering it to be strong enough, and in a right direction; and, in the mean time, he is to compress the articulation gently with his hands and fingers, till he find the elapsed bone recover its right place; which is known to have been effected, if it be heard to snap in the re-

duction, or by the limb's being able to perform its office. In cases where the luxation is attended with a fracture, the reduction must be put off till the fracture be well joined by a firm callus.

When the bones are properly reduced, they must be retained in their places by proper bandages and rest; and when these happen in the lower extremities, the patient should rest a few days in his bed; moving the limb gently as soon as he finds it capable, and afterwards he may rise and walk cautiously.

On the other hand, when the luxation is inveterate, and the ligaments have been much stretched by violent and long continued distention, it is highly necessary to make use of some bandage after reduction; and in the mean time, to bathe the part well with spirit of wine, hungary-water, or some other warm and strengthening medicine, by which means the ligaments usually become very firm and strong.

As to the symptoms which happen before or after the reduction of a luxation, such as inflammations, tumours, convulsions, hæmorrhages, &c. they must be treated in the manner directed under these articles. If a slight fever should attend, bleeding, a thin diet, and cooling medicines are to be used. If an abscess should be formed, it should be opened as soon as ripe, lest the articulation and bones be corroded, which often make amputation of the limb necessary. If a luxation is attended with a fracture, it should be reduced first, and the fracture set afterwards: and, lastly, if the bones be dislocated with such violence as to break and destroy the ligaments, tendons, and adjacent skin, the only method left is speedily to amputate the limb. See the article AMPUTATION.

Luxations of the jaw, clavicle, arm, and hand, are more readily reduced on a low stool; such as happen in the vertebræ or thighs, on a table; such as happen in the legs or feet, on a bed; and, lastly, those which happen on the shoulders or vertebræ of the neck, are most commodiously reduced on the floor. See JAW, HUMERUS, THIGH, VERTEBRÆ, &c.

LUXATION of the ankle. See the article ANKLE LUXATED.

LUXEMBURG, the capital of the dutchy of the same name, situated an hundred miles south-east of Brussels, is a small but strong fortress: east long. $6^{\circ} 8'$, north lat. $49^{\circ} 45'$.

L U Z.

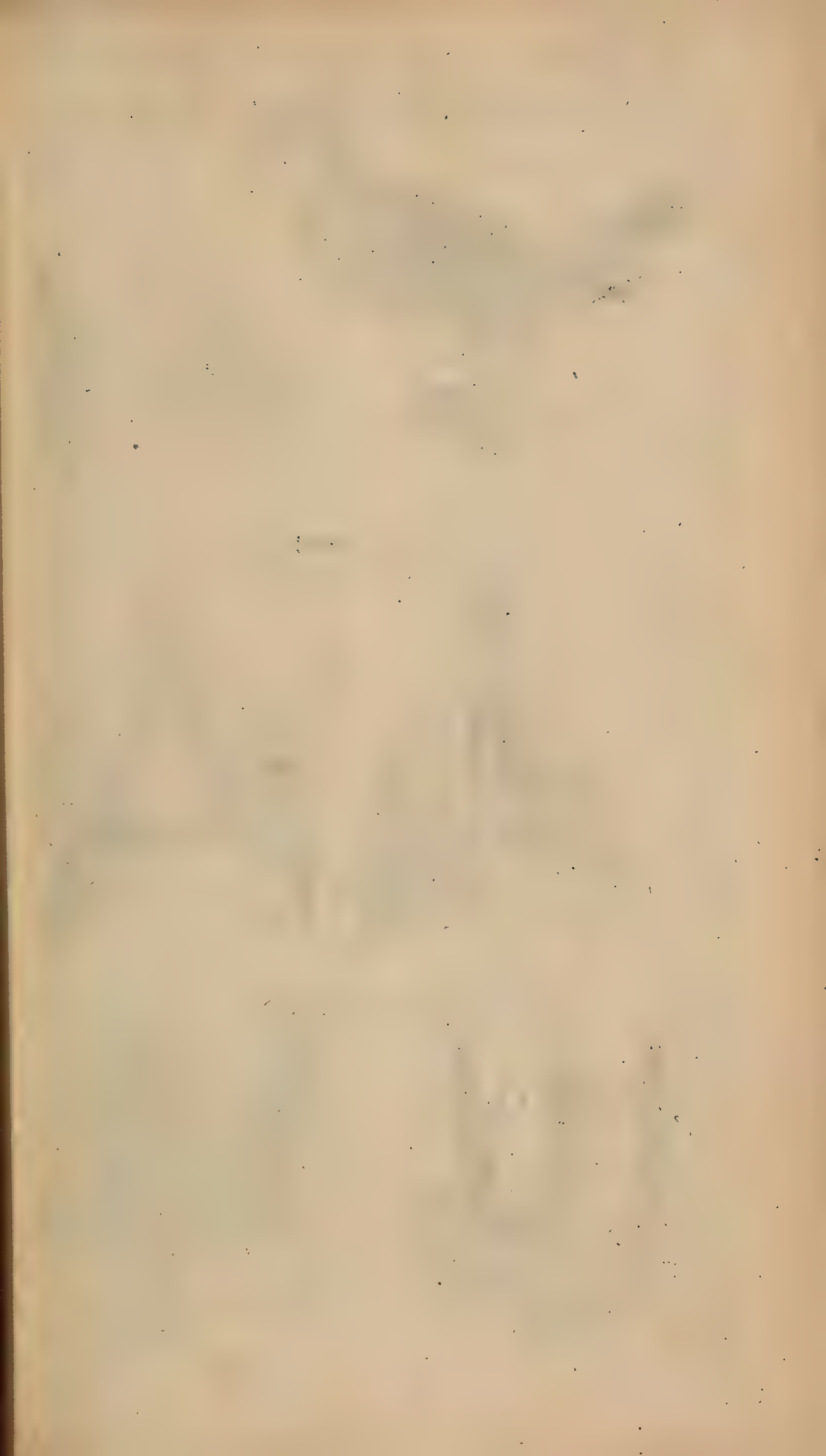


Fig. 1. LOXIA, the CROSS-BILL.



Fig. 3. LYCOPERDON.

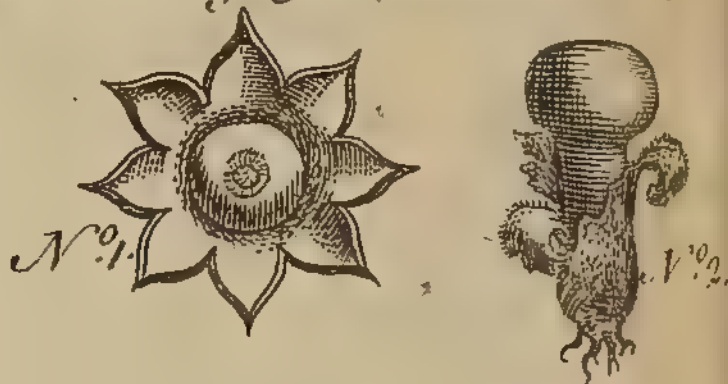


Fig. 2. the LUNGS.

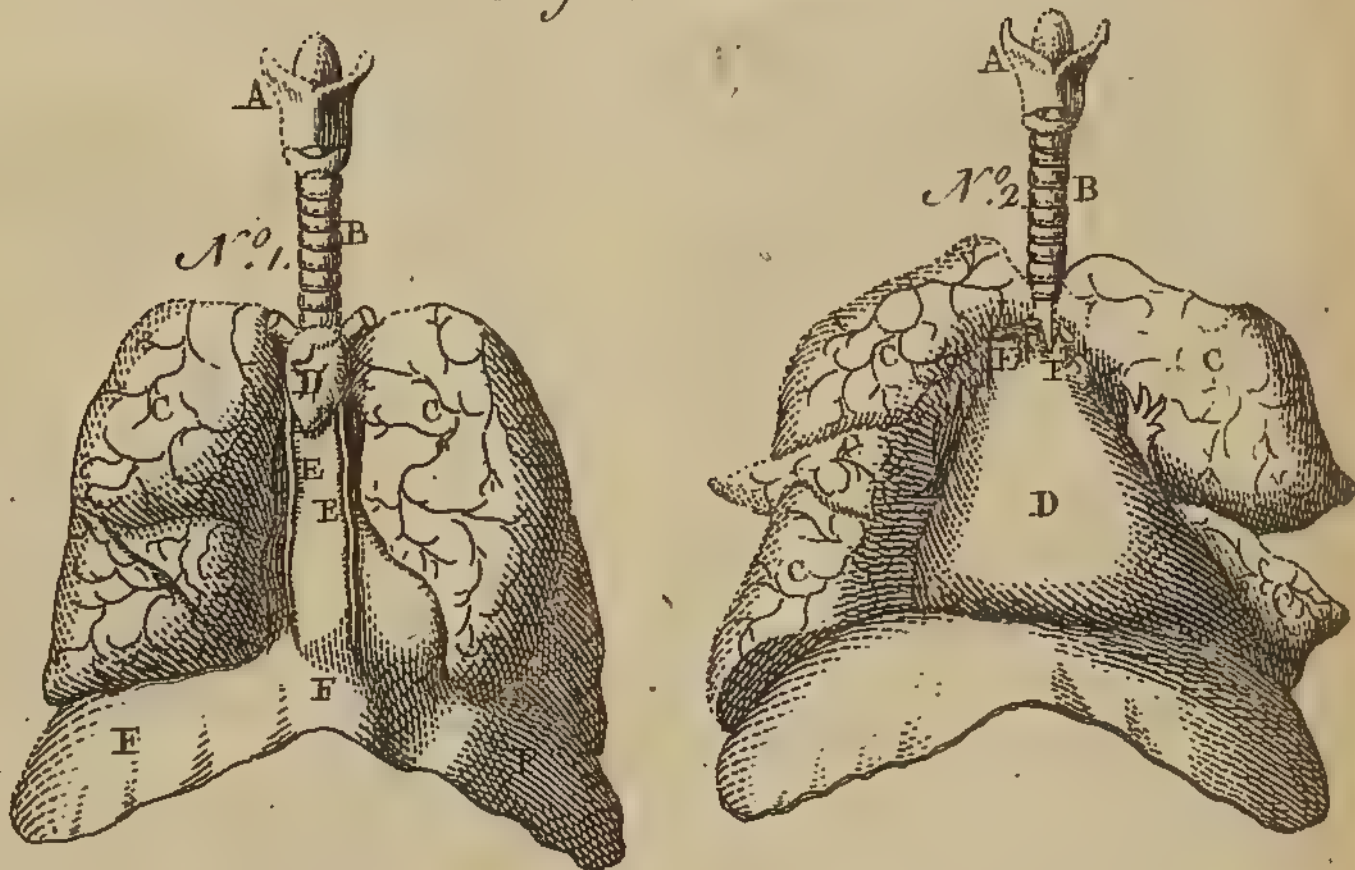


Fig. 4. LYCOPODIUM



LUZZARA, a town of Italy, twelve miles south of Mantua.

LYBIA, a name antiently given to all the coast of Barbary, especially that part lying westward of Egypt.

LYCANTHROPY, in medicine, a deep melancholy, wherein the patients imagine themselves wolves; and accordingly shun company, and go into woods and lonely places, howling like wolves. See the article **MELANCHOLY**.

LYCAONIA, an antient province of lesser Asia, whereof Cogni is now the capital.

LYCEUM, in grecian antiquity, an academy situated upon the banks of the Ilissus at Athens. It was composed of porticos and walks, where Aristotle taught philosophy; walking there constantly every day till the hour of anointing, whence he and his followers were called peripatetics. See the article **PERIPATETIC PHILOSOPHY**.

LYCHAM, or **LITCHAM**, a market-town of Norfolk, eighteen miles west of Norwich.

LYCHNIS, **CATCH-FLY**, or **CUCKOW-FLOWER**, in botany, a genus of the *pentandria-pentagynia* class of plants, the flower of which consists of five petals; the unguis of which equal the cup in length, and their limb is plain; the nectarium is composed of two denticles, placed in the neck of each petal: the fruit is a capsule, approaching to an oval figure, covered, and containing only one cell, with numerous roundish seeds. See plate **CLXIII.** fig. 4.

LYCIUM, **AVIGNON-THORN**, in botany, a genus of the *pentandria-monogynia* class of plants, the corolla of which is a single funnel-like petal, with a cylindraceous tube, and the limb divided into five segments: the fruit is a roundish bilocular berry, containing a great many kidney-shaped seeds.

LYCODONTES, in natural history, the petrified teeth of the *lupus-piscis*, or wolf-fish, frequently found fossil. They are of different shapes, but the most common kind rise into a semiorbicular form, and are hollow within, somewhat resembling an acorn-cup: this hollow is found sometimes empty, and sometimes filled with the stratum in which it is immersed. Many of them have an outer-circle, of a different colour from the rest.

LYCOPERDON, **PUFF BALL**, in botany, a genus of funguses, of a fleshy substance like other mushrooms, and roundish shape. They are sometimes sessile, and

sometimes stand on a thick pedicle: they produce separate male and female flowers, contained in the cellular fungous substance; which remains a long time confused, and the fructifications not formed; and when they are formed, and the cells distinct, it is but a very short time before the very matter of the cells breaks to powder, and the seeds fall out of the cavities of the placentæ; and the whole matter, powder, seeds, and filaments of the placentæ, are discharged altogether in form of a fine dust.

Of this genus there are a great many species, the most remarkable of which is the starchy lycoperdon, or puff-ball, with multifid rays, and a stellated osculum. See plate **CLXIV.** fig. 3. n° 1. to which we may add the pediculated lycoperdon, with a hairy lacerated volva, *ibid.* n° 2.

LYCOPODIUM, **WOLF'S CLAW-MOSS**, in botany, a genus of mosses consisting of branches, furnished with leaves, and producing spikes formed of squamæ, of a different figure from the leaves; at the bases of which are placed capsules, of a kidney-like shape, which have no cup or vagina; and, when ripe, open longitudinally into two parts, and discharge a great quantity of fine powder.

The lycopodiums have all one general appearance, by which they may be distinguished to belong to the same family; only in some, the spikes are continuous to the rest of the stalk, and in others, they are supported on peculiar pedicles. See plate **CLXIV.** fig. 4. n° 1 and 2.

LYCOPSIS, in botany, a genus of the *pentandria-monogynia* class of plants, comprehending the *echioides* and *buglossoides* of Rivinus, and the *buglossum* of Morison; its corolla consists of a single petal, with a cylindraceous tube, and a semiquinifid limb: the calyx answers to the purpose of a pericarpium, containing four oblong seeds. It is nearly allied to *echium*, or viper's bugloss. See the article **ECHIUM**.

LYCOPUS, **WATER HOREHOUND**, in botany, a genus of the *diandria-monogynia* class of plants, the flower of which consists of a single petal, with a cylindraceous tube, and a quadrifid limb: there is no fruit; the seeds, which are four and roundish, being lodged in the cup.

LYDIA, an antient province of lesser Asia, in which was the city of Philadelphia.

LYGEUM, in botany, a genus of the *triandria-monogynia* class of plants, the calyx of which is a single leaved, convolute,

oval, acuminate spatha: the corollæ are two in number, equal, and placed on the germen: the fruit is an oblong very hairy nut, containing two cells, in which is a single, oblong, linear seed, convex on one side, and plane on the other.

LYING-IN-WOMEN, in midwifery, those lately delivered of a child. See the articles **DELIVERY**, **LOCHIA**, &c.

After pains are the most common complaint to which lying-in-women are subject; and as these are useful, serving to promote the lochia, and the discharge of clotted blood, nothing more is necessary than to keep the woman warm, by applying a warm cloth to the belly. Excessive after-pains are greatly mitigated by carminative, aromatic, and nervous medicines; and in case the woman is constive, an emollient clyster is proper.

In difficult labours, the vagina and external parts are subject to contusions, inflammations, and dilacerations. In case of contusion, La Motte recommends embrocations with warm wine, with a little chervil in it; and as to lacerations of the perinæum or vagina, the same author advises a reunion by the suture, whilst the wound is recent. Contusions, inflammations, and even mortifications, are often caused by a midwife's too rudely handling the parts; in which cases, bleeding, scarification, and embrocation become necessary. In slighter excoriations, it will be sufficient to bathe the parts with warm milk, barley-water, a decoction of liquorice and chervil; and afterwards, to embrocate with wine and chervil.

In case of a bilious diarrhoea, which often proves a very terrible symptom, it is usual to give absorbent powders, and afterwards the bitter extracts, with small doses of rhubarb. Astringents and an improper use of opium are very dangerous. Flatulencies are cured by carminatives, aromatics, and absorbent powder.

LYME, a borough and port-town of Dorsetshire, east long. $3^{\circ} 5'$, and north lat. $50^{\circ} 44'$.

It sends two members to parliament.

LYMPH, *lymphe*, a fine fluid, separated in the body from the mass of blood, and contained in peculiar vessels.

Dr. Keil says, that the lymph being chemically examined, will be found to contain a great deal of volatile, but no fixed salt, some phlegm, some sulphur, and a little earth. The use of the lymph,

he observes, may be gathered from the consideration of the parts into which it discharges itself: that which comes from the head, neck, and arms; is thrown into the jugular and subclavian veins; all the lymphatics which the parts in the cavity of the thorax send out, empty themselves into the thoracic duct; and the lymph from all the rest of the body, flows to the receptacle of the chyle; so that there can be no doubt but its chief use is to dilute and perfect the chyle before it mixes with the blood. Now the whole lymph which is separated from the blood, being requisite for this use, it is plain there could be no glands in the abdomen, appropriated for the separation of the whole lymph, but what must have had a very great share of the blood which passes through the aorta, in order to separate so great a quantity of lymph; but the liver and kidneys requiring also a great quantity of blood, and which could not be avoided, nature chose to separate the lymph from the blood which goes to all the parts of the body, rather than appoint particular glands for it in the abdomen, which would have been more at hand, but would have robbed the other parts of a large quantity of blood, and occasioned a very unequal distribution of it.

For the lymphatic glands, see **GLAND**. There are three sorts of vessels which go by the name of lymphatics, whereas formerly that word was used to signify the transparent vessels, which accompany the lymphatic glands. The original sources of these vessels, Winslow observes, are very difficult to be found out, and even their distribution through the body has not been sufficiently traced, to enable us to describe them particularly. As to their termination, we are sure, that, for the most part, they end in the thoracic duct. Besides these vessels which accompany the glands, there are others, of the same structure found on the several viscera, where no lymphatic glands have yet been discovered. We meet with them in very great numbers in the external membrane of the liver, and in the duplicature of the superior membranous ligament of this organ. Several discoveries about these vessels have been made in brutes.

The third sort of vessels, termed lymphatic vessels, are the small arteries and veins which in the natural state transmit only the serous part of the blood. These vessels

fels differ from those of the first, in the smallness of their diameter, and in their structure and situation. All these little arteries and veins are uniform, extremely narrow, and though their sides are not thinner than those of the valvular lymphatics, yet their diameters are generally less. The other lymphatics are full of valves and very thin, but they are not narrow in proportion. The arterial and venous lymphatics are found on the parts which are naturally white, as on the skin, and the white of the eye; and their origin are easily discoverable; but the valvular lymphatics are confined to the internal parts of the body, and are found on the parts of all colours; but we cannot easily trace them to their original state.

LYMPHATICS, or LYMPHEDUCTS, in anatomy. See the preceding article.

LYNN-REGIS, a port-town of Norfolk, situated at the mouth of the river Ouse, on a bay of the German sea, thirty-two miles west of Norwich.

It sends two members to parliament.

LYNX, or OUNCE, in zoology, a species of the felis kind, with a truncated tail, a brown body spotted with black; the head is large, but not very long; the forehead is flat, the eyes are large and fierce; the ears are very large and open, but they terminate in a point at the top, and are there ornamented with a pencil of fine black hairs; the mouth is furnished with very terrible teeth, and there are whiskers about it, as also over the eyes; the neck is long and thick, the breast large and broad, the legs strong, the claws terrible, the tail short and abrupt; and the whole animal large and robust, somewhat less than the lion, very fierce, and remarkable for the quickness of its sight.

LYON, or LION. See the article LION.

LYON, or LION, *King at arms*. See KING at arms, and COLLEGE of heralds.

LYONS, the capital of the Lyonois, a province of France, bounded by Orleans and Burgundy on the north, by la Bresse and Dauphine on the east, by Languedoc and Guienne on the south, and by another part of Guienne and Orleans on the west. This city lies upon the confluence of the rivers Rhone and Soan, in east long. $4^{\circ} 55'$, and north lat. $45^{\circ} 50'$. Next to Paris, it is esteemed the place of greatest trade in France.

LYRA, in ichthyology, the name of a fish of the cuculus or gurnard-kind, of

which there are two species, the one called tibicen. See the article TIBICEN.

The other, the lyra cornuta, or horned harp-fish, of an octogonal form, covered all over with bony scales, which are of a rhomboidal figure, each having in its middle a sharp and strong prickle, bending backwards; its snout divides towards the extremity into two large horns, on which are placed two perpendicular spines, which with a third above, makes an acute angle: its mouth is large, but it has no teeth.

LYRA is also the name of a beautiful sea-shell, of the genus of the concha globosa, or dolium.

LYRE, *lyra*, a musical instrument of the string-kind, much used by the antients. See the article CITHARA.

Ammianus Marcellinus says, that there were lyres as big as calashes. Quintilian says, that the musicians having divided the sounds of the lyre into five scales, each of which had several degrees, they have placed between the strings which give the first tones of each of those scales, other strings which gave intermediate sounds; and these strings have been multiplied in such a manner, that to pass from one of the five master-strings to the other, there are as many strings as there are scales. The crier who proclaimed the laws, among the Greeks, was accompanied by a harper or player on the lyre.

From the lyre, which all agree to have been the first instrument of the string-kind in Greece, arose an infinite number of others, differing in shape and number of strings, as the psalterion, trigon, sambucus, pectis, magadis, barbiton, testudo, (the two last are used promiscuously by Horace with cythara and lyra) epigonium, simmicium, and pandoron; which were all struck with the hand, a plectrum or a little iron-rod. We have no satisfactory account of their shape, structure, or number of strings; their bare names only have been transmitted to us by the antients. We find, indeed, numbers of instruments on old medals; but whether they are any of these, we cannot find out. The modern lyre, or welsh-harp, consisting of forty strings, is sufficiently known.

The lyre among poets, painters, statuary, caryers, &c. is attributed to Apollo and the Muses.

LYRE, *lyra*, in astronomy, a constellation of

of the northern hemisphere, the number of whose stars, in Ptolemy's and Tycho's catalogues are only 10, but 19 in the Britannic catalogue.

LYRIC, in general, signifies something sung or played on the lyre: but it is more particularly applied to the antient odes and stanzas, answering to our airs and songs, and may be played on instruments. This species of poetry was originally employed in celebrating the praises of gods and heroes, though it was afterwards introduced into feasts and public diversions. Mr. Barnes shews how unjust it is to exclude heroic subjects from this kind of verse, which is capable of all the elevation such matters require. The characteristic of this kind of poetry is, according to Trapp, the sweetness and variety of the verse, the delicacy of the words and thoughts, the agreeableness of the numbers, and the description of things most pleasing in their own natures. At first the lyric verse was only of one kind, but afterwards they so continued to vary the feet and numbers, that the variety of them now are almost innumerable.

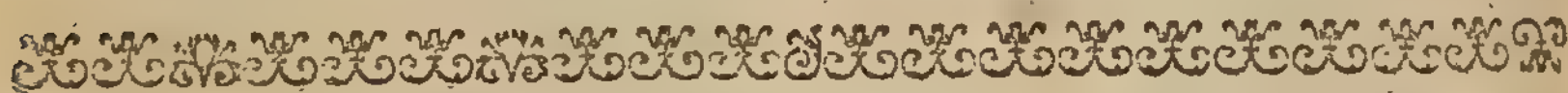
This kind of poem is distinguished from all other odes by the happy transitions and digressions which it beautifully admits, and the surprising and natural easy returns to the subject, which is not to be obtained without great judgment and genius.

The lyric is, of all kinds of poetry, the most poetical, and is as distinct, both in style and thought, from the rest, as poetry is in general from prose: it is the boldest of all other kinds, full of rapture, and elevated from common language the

most that is possible: some odes there are likewise, in the free and loose manner, which seems to avoid all method, and yet are conducted by a very clear one; which affects transitions seemingly without art, but for that reason have the more of it; which are above connection, and delight in exclamations and frequent invocations of the muses; which begin and end abruptly, and are carried on through a variety of matter with a sort of divine pathos, above rules and laws, and without regard to the common forms of grammar. Pindar has set his successors the example of digressions and excursions. To write a lyric poem are required not only a flowing imagination, brightness, life, sublimity, and elegance, but the nicest art and finest judgment, so as to seem luxuriant, and not be so; and under the shew of transgressing all laws, to preserve them.

LYSIMACHIA, **WILLOW-HERB**, in botany, a genus of the pentandria monogynia class of plants, the corolla whereof consists of a single petal; the tube is scarce discernible; the limb is divided into five ovato-oblong segments; the fruit is a capsule of a globose figure, composed of ten valves, and having only one cell; the seeds are numerous, and angulated, the receptacle globose, large, and punctuated.

LYTHRUM, in botany, a genus of the dodecandria monogynia class of plants, the corolla whereof consists of six oblong, obtuse, patent petals, inserted by their ungues into the segments of the cup; the fruit is an oblong, acuminate, and bilocular capsule, containing a great number of small seeds.



M.

M, Or m, the twelfth letter and ninth consonant of our alphabet: it is a liquid and labial consonant, pronounced by striking or moving the under lip against the upper one: its sound is always the same in english, and it admits no consonant after it in the beginning of words and syllables, except in some greek words, nor does it come after any in that case. It suffers not the sound of n, coming after it, to be heard, as in autumn, solemn, &c.

As a numeral, M stands for mille, a thousand; and with a dash over it, thus, \overline{M} , for a thousand times a thousand, or, 1000000. Used as an abbreviature, M, signifies Manilius, Marcus, Martius, Mucius; and M'. Manius; M. B. mulier bona; Mag. Eq. magister equitum; Mag. Mil. magister militum; M. M. P. manu mancipio potestate; M. A. magister artium; M. S. manuscript; and M. S. S. manuscripts, in the plural. In the prescription of physicians, M. stands

stands for manipulus, a handful; and sometimes for misce, or mixtura: thus M. F. Jupalium, signifies mix and make into a julep. In astronomy, &c. M is used for meridian or meridional; and, in law, M. is the stigma burnt on the brawny part of the left thumb of a person convicted of manslaughter.

MABBY, according to Mr. Boyle, is a kind of wine made from potatoes, and said to be used in Barbadoes.

MAC, an irish word, signifying a son, frequently added to the beginning of surnames, as Mac Donald, for Donaldson; Mac Laurin, for Laurence's son, &c.

MACAO, an island of China, in the province of Canton, fifty miles south of Canton.

MACAO, or **MACAW**, in ornithology, a name given to the larger species of parrots with very long tails. See **PARROT**, and **ERYTHROCYANEUS**.

MACARONIC, or **MACARONIAN**, an appellation given to a burlesque kind of poetry, made up of a jumble of words of different languages, and words of the vulgar tongue latinized.

The Italians are said to have been the inventors of it. The Germans, French, Spaniards, &c. have also had their macaronic poets; nor is Great Britain outdone in this respect, witness Drummond of Hawthornden's poem called Polemo Middinia, which begins thus:

*Nymphæ, quæ colitis hîgbissima monta
Fifæa,*

*Seu vos Pitten-weema tenet, seu Creliæ
crôsta, &c.*

MACAROON, a delicious cake, said to be the favourite of the Italians, as pudding is in England; from whence it is remarked, that the merry-andrews of all nations are called by the national character: thus, in England, they are called jack-puddings; in Holland, pickle herrings; in Italy, macaroons, &c.

MACASSER, a large island in the East-Indies. See the article **CELEBES**.

MACCABEES, two apocryphal books of scripture; so called from Judas Mattathias, surnamed Maccabeus. The first book of the Maccabees is an excellent history, and comes nearest to the style and manner of the sacred historians of any extant. It contains the history of forty years, from the reign of Antiochus Epiphanes to the death of Simon the high priest; that is, from the year of the world 3829 to the year 3869, 131 years before Christ. The second book of the Maccabees begins with two epistles sent

from the Jews of Jerusalem to the Jews of Egypt and Alexandria, to exhort them to observe the feast of the dedication of the new altar, erected by Judas on his purifying the temple. After these epistles follows the preface of the author to his history, which is an abridgment of a larger work, composed by one Jason, a Jew of Cyrene, who wrote the history of Judas Maccabeus, and his brethren, and the wars against Antiochus Epiphanes, and Eupator his son. This second book does not, by any means, equal the accuracy and excellency of the first. It contains a history of about fifteen years, from the execution of Heliodorus's commission, who was sent by Seleucus to fetch away the treasures of the temple, to the victory obtained by Judas Maccabeus over Nicanor; that is, from the year of the world 3828, to the year 3843, 147 years before Christ.

Upon the whole, it must be acknowledged, that there are great errors, and often different and even contradictory accounts to be found in them, especially in the second, arising probably either from ignorance of the greek and roman history, or from national prejudice and an immoderate partiality in favour of the jewish nation.

The romanists receive four books of the Maccabees, of which the two first, already mentioned, are with them canonical, and the two last apocryphal.

MACCLESFIELD, a market town of Cheshire, thirty-five miles east of Chester, from whence the noble family of Parker take the title of earl.

MACE, the second coat or covering of the kernel of the nutmeg, is a thin and membranaceous substance, of an oleaginous nature and a yellowish colour; being met with in flakes of an inch and more in length, which are divided into a multitude of ramifications. It is of an extremely fragrant, aromatic and agreeable flavour, and of a pleasant, but arid and oleaginous taste. See the article **NUTMEG**.

Mace is carminative, stomachic and astringent; and possesses all the virtues of nutmeg, but is less astringent. Nurses are said to apply oil of mace, by expression, to children's navels to ease their gripes, and that often with success; and rubbed on the temples, it is said to promote sleep. Its oil, by distillation, is very proper to be added to the stronger cathartics in form of pills by way of corrective.

Mace

Mace, the pound, pays on importation,
 $3 \text{ s. } 0 \frac{77^2}{100} \text{ d.}$ and draws back, on exportation, $2 \text{ s. } 8 \frac{66^2}{100} \text{ d.}$

MACEDONIA, a province of European Turkey, bounded by Servia and Rumania, on the north and east; by the gulphs of Salonichi, Contessa and Theffaly, on the south; and by Albania and Epirus on the west.

MACERATA, a city of the marquisate of Ancona, in the territories of the pope: east long. 15° . north lat. $43^\circ, 15'$.

MACERATION, in pharmacy, is an infusion of, or soaking ingredients in water, or any other fluid, in order either to soften them, or draw out their virtues. Lemery defines maceration to be a sort of digestion confined to thick substances: thus, says he, when rose-leaves are put into fat, in order to make oil of roses, this mixture is, for some days, exposed to the sun, in order to macerate, that the quality of the roses may be the better conveyed to the fat.

MACHIAN, a small island of the Moluccas, which produces the best cloves: it is situated under the equator, in 125° east long. and is subject to the Dutch.

MACHINE, *machina*, in general, whatever hath force sufficient to raise or stop the motion of a heavy body.

Machines are either simple or compound; the simple ones are the seven mechanical powers, *viz.* lever, ballance, pully, axis and wheel, wedge, screw, and inclined plane. See the articles POWER, LEVER, BALLANCE, &c.

From these the compound ones are formed by various combinations, and serve for different purposes; in all which, the same general laws take place, *viz.* that the power and weight sustain each other, when they are in the inverse proportion of the velocities they would have in the directions wherein they act if they were put in motion. Now, to apply this law to any compound machine, there are four things to be considered:

1. The moving power, or the force that puts the machine in motion; which may be either men or other animals, weights, springs, the wind, a stream of water, &c.
2. The velocity of this power, or the space it moves over in a given time.
3. The resistance, or quantity of the weight to be moved.
4. The velocity of this weight, or the space it moves over in the same given time.

The two first of these quantities are always in the reciprocal proportion of the two last; that is, the product of the first two must always be equal to that of the last: hence, three of these quantities being given, it is easy to find the fourth; for example, if the quantity of the power be 4, its velocity 15, and the velocity of the weight 2, then the resistance, or quantity of the weight will be equal to $\frac{4 \times 15}{2}$

$$= \frac{60}{2} = 30.$$

Compound machines are extremely numerous, as mills, pumps, wheel-carriages, clocks, fire-engines, &c. See the articles ENGINE, MILL, PUMP, WATER-WORKS, &c.

In plate CLXV. fig. 1. is a compound machine, wherein are combined all the simple mechanical powers. It is contained in a frame A B C D, fastened by the nut *n* upon the stand *n* O, and held together by the pillars V W and B q. 1. The piece E F, whose vanes, or flies, may be put in motion by the wind, or drawn by a hair fastened at F, represents the lever and ballance. 2. At right angles to this is joined the perpendicular spindle G H, having upon it the endless screw H, which may also be considered as a wedge. 3. This endless screw, or worm, takes the skew teeth of the wheel K, which is the axis in peritrochio; and, in turning round, winds up the string L M upon its axis, which passing round the pulleys at M and N, or drawing by a tackle of five, raises the weight P. But as the screw has no progressive motion on its axis, it cannot here be said to take in the inclined plane; therefore, to make this engine take in all the mechanical powers, we may add the inclined plane *r q* Q R, by making it rest on the ground at Q R, and on the pillar q B at *r q*; whereby the force of the power, drawing at F, will be farther increased in the ratio of Q T, the length of the plane, to T S, its height.

The whole force gained by this machine, is found by comparing the space gone through by the point F, with the height that the weight is raised in any determinate number of revolutions of F; and this force is so considerable, that an hundred pounds weight at P will be easily raised by the hair of a man's head drawing at F.

In cranes, and many other machines, the power is so applied to one part of the machine

Fig. 1. Compound MACHINE.

Fig. 2. MACULÆ.

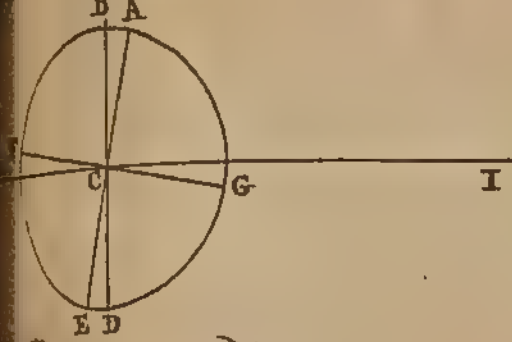


Fig. 3. MANTLE.

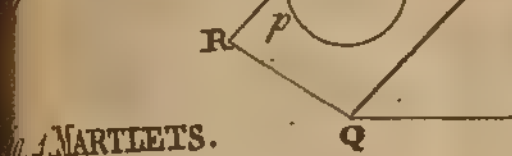


Fig. 4. MARTLETS.

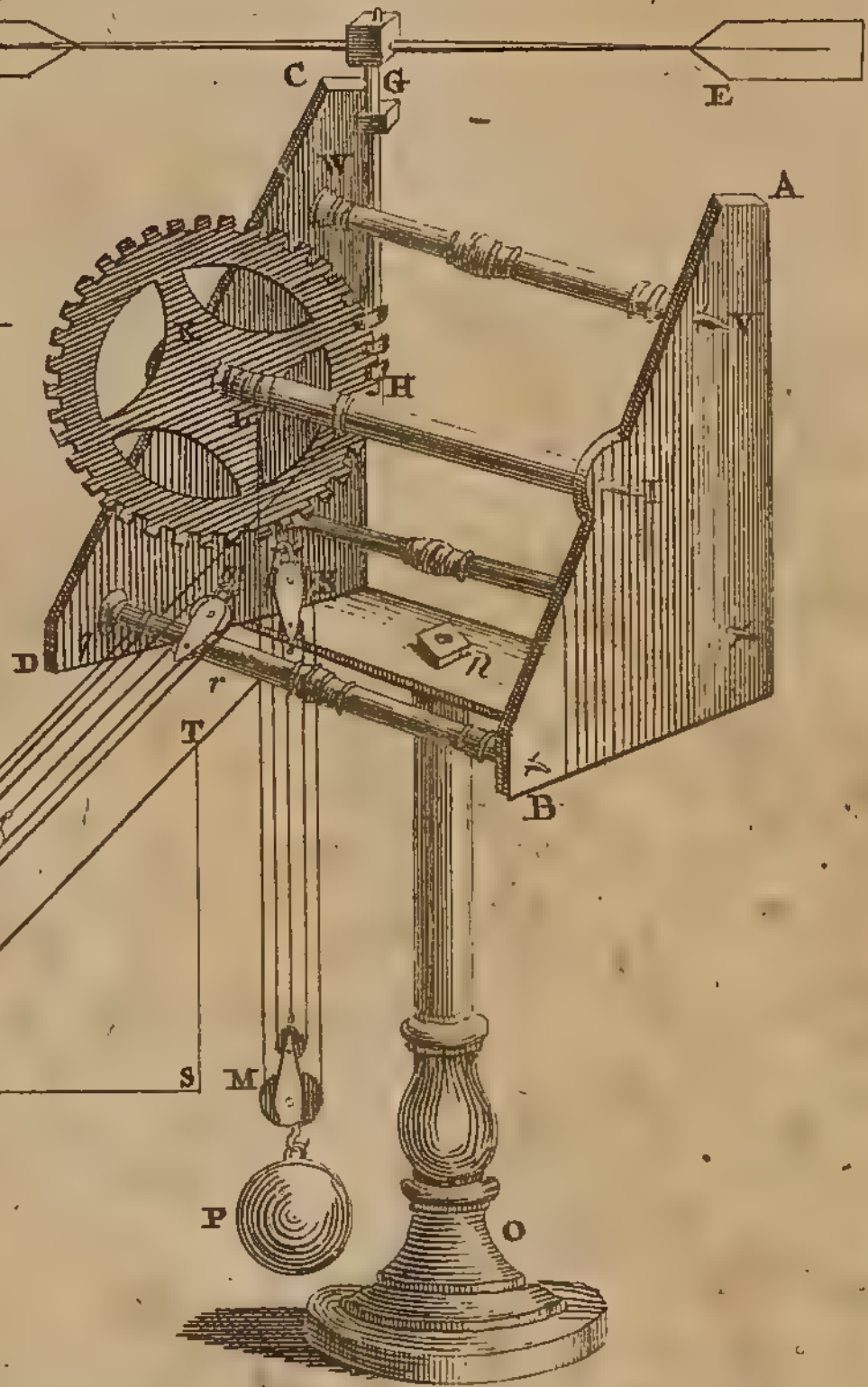
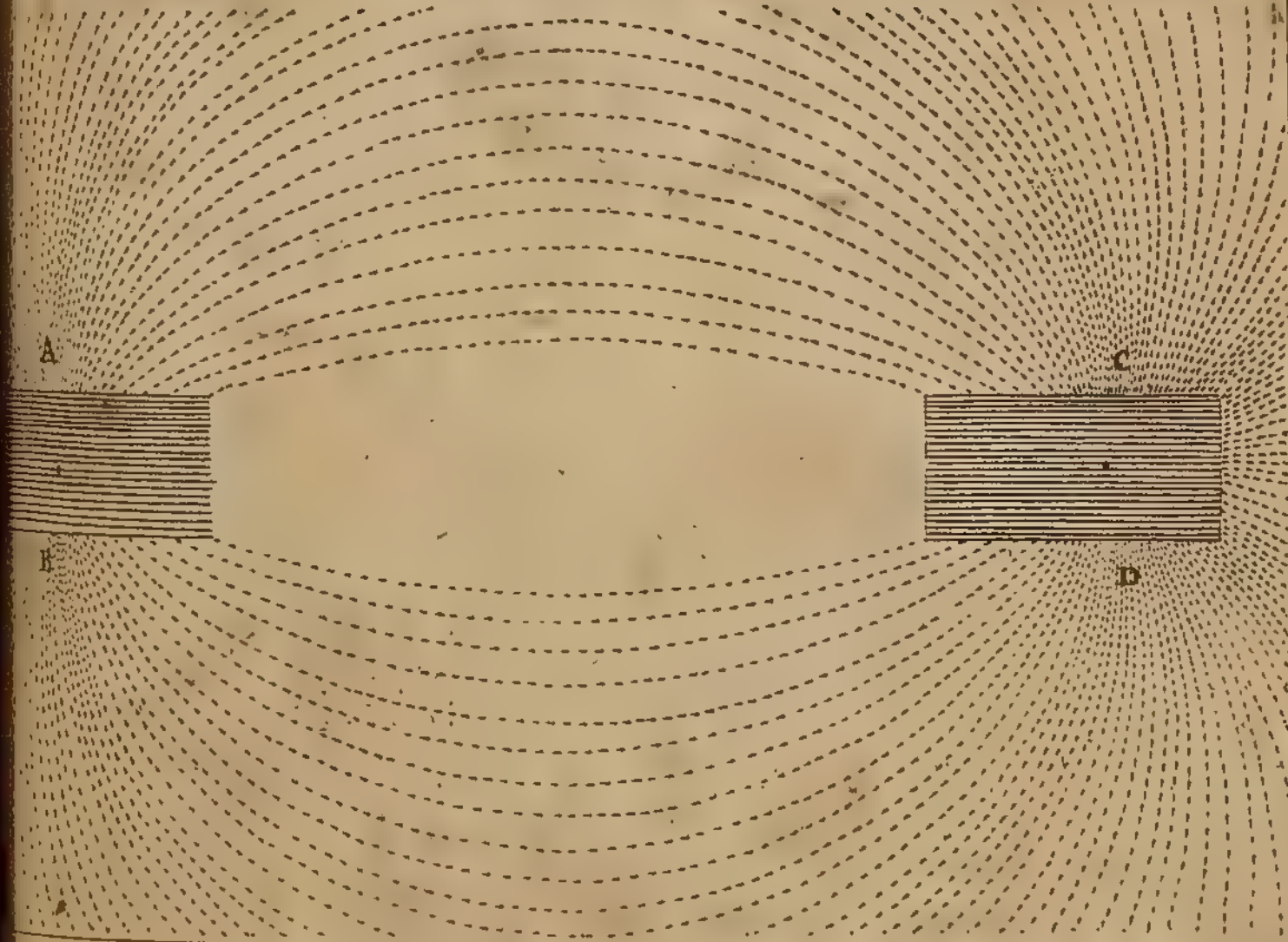


Fig. 5. MAGNET.



J. Jefferys sculp

machine as to act immediately upon the weight; but there are others, as the engine for driving piles, in which the force of the power is accumulated before the weight is acted on at all. See the articles CRANE, ENGINE, FLY, &c.

As descriptions and draughts of machines, instruments, tools, &c. must be very acceptable to the public, we have, through the course of this work, given the constructions and uses of a very great number; some from Belidor's Architecture hydraulique, others from Desaguliers, Hales, the Philosophical Transactions, 'S Gravesande, Muschenbroek, Martin, Moxon, Varignon's Mechanique, Heister's Surgery, with other books both on the liberal and mechanical arts; and where these proved deficient, some have been taken from original designs.

MACHINERY, in epic and dramatic poetry, is when the poet introduces the use of machines, or brings some supernatural being upon the stage, in order to solve some difficulty, or to perform some exploit out of the reach of human power. The antient dramatic poets never made use of machines, unless where there was an absolute necessity for so doing; whence the precept of Horace,

Nec Deus interfit, nisi dignus vindice nodus—inciderit.

It is quite otherwise with epic poets, who introduce machines in every part of their poem; so that nothing is done without the intervention of the gods. In Milton's Paradise Lost, by far the greater part of the actors are supernatural personages: Homer and Virgil do nothing without them; and in Voltaire's Henriade, the poet has made excellent use of St. Louis.

As to the manner in which these machines should act, it is sometimes invisibly, by simple inspirations and suggestions; sometimes by actually appearing under some human form; and, lastly, by means of dreams and oracles, which partake of the other two. However, all these should be so managed as to keep within the bounds of probability.

MACHINLETH, a market town of north Wales, twenty-eight miles west of Montgomery.

MACKERAN, or **MACKAN**, the capital of a province in Persia of the same name; situated in east long. 66°, and north lat. 26°.

MACKREL, in ichthyology, a species of

scomber, with five pinnules at the extremity of the back, and a spine at the anus. See the article SCOMBER.

MACRO, or **MACRONISSA**, an island of the Archipelago, twenty miles east of Athens.

MACROCERCI, in zoology, a name given to that class of animalcules, with tails longer than their bodies. See the article ANIMALCULE.

MACROCOSM, an affected term used by some for the universe, in contradistinction to microcosm. See MICROCOSM.

MACROLOGY, in rhetoric, a too copious style. See the article STYLE.

MACROPYRENIUM, in natural history, a genus of fossils, consisting of crusted septariæ, with a long nucleus standing out at each end of the mass. See the article SEPTARIÆ.

Of this genus there is only one known species. This is one of the most singular and extraordinary bodies of the mineral kingdom: it is of a close, compact, and firm texture, of a very rugged and unequal surface, ever of a determinate and very singular shape, which is an oblong and cylindric figure: in size, it is one of the most determinate and regular of all the native fossils: its length is between seven and eight inches, and its diameter, in the center or thickest part, three inches; when broken, we find it composed of a central nucleus, of a ferrugineous colour, naturally hollow, but commonly filled up with an earthy matter; this is inclosed in a thin crust of a brownish matter, of almost equal hardness; these are surrounded with a single, double, or, in some specimens, a triple circular septum, of an elegant columnar spar, which is again environed by two thick crusts of a brownish matter of the kind of the rest of the septariæ; this makes the body of the mass, and is divided by four or five other septa, parting like rays from the circular one, and making straight towards the circumference of the stone; and the whole of this is surrounded with a rugged and unequal, white, brownish coat of about one third of an inch in diameter; the cavity of the central nucleus is of half an inch diameter, and the nucleus itself is a very heavy body, of great hardness, and capable of a fine polish.

MACROTELOSTYLA, in natural history, a name of a genus of crystals, which are composed of two pyramids, joined to the end of a column; both the pyramids, as also the column, being hexangular

hexangular, and the whole body consequently composed of eighteen planes. See the article CRYSTAL.

MACULÆ, in astronomy, dark spots appearing on the luminous faces of the sun, moon, and even some of the planets; in which sense they stand contradistinguished from faculæ. See FACULÆ. These spots are most numerous and easily observed in the sun. It is not uncommon to see them in various forms, magnitudes and numbers, moving over the sun's disk. They were first of all discovered by the lyncean astronomer Galileo, in the year 1610, soon after he had finished his new invented telescope. That these spots adhere to, or float upon, the surface of the sun, is evident for many reasons. 1. Many of them are observed to break out near the middle of the sun's disk; others to decay and vanish there, or at some distance from his limb. 2. Their apparent velocities are always greatest over the middle of the disk, and gradually slower from thence on each side towards the limb. 3. The shape of the spots varies according to their position on the several parts of the disk: those which are round and broad in the middle, grow oblong and slender as they approach the limb, according as they ought to appear by the rules of optics.

By comparing many observations of the intervals of time in which the spots made their revolution, by Galileo, Cassini, Scheiner, Hevelius, Dr. Halley, Dr. Derham, and others, it is found that 27 days, 12 hours, 20 minutes, is the measure of one of them at a mean; but in this time the earth describes the angular motion of $26^{\circ} 22'$, about the sun's center: therefore say, as the angular motion of $360^{\circ} + 26^{\circ} 22'$, is to 360° ; so is 27 days, 12 hours, 20 minutes, to 25 days, 15 hours, 16 minutes; which, therefore, is the time of the sun's revolution about its axis.

Had the spots moved over the sun in right lined directions, it would have shewn the sun's axis to have been perpendicular to the plane of the ecliptic, but since they move in a curvilinear path, it proves his axis inclined to the axis of the ecliptic, and it is found by observation, that the angle is equal to $7^{\circ} 30'$; that is, if B D (plate CLXV, fig. 2.) passing through the center of the sun C, be perpendicular to the plane of the earth's equator H I, then will the axis of the sun's motion, A E, contain, with that perpendicular,

the angle A C B, $= 7^{\circ} 30' = G C I$, the angle which the equator of the sun G F makes with the plane of the ecliptic: and the points in which a plane, passing through the perpendicular B D and axis A E, cuts the ecliptic are in the eighth degree of pisces, on the side next the sun's north pole A, and consequently in the eighth degree of virgo, on the other side next the sun's south pole E. Scheiner had determined the angle B C A to be 7° , and Cassini made it eight by his observations, which is the reason why $7^{\circ} 30'$ is chosen for a mean.

As to the magnitude of the spots, they are very considerable, as will appear if we observe that some of them are so large as to be plainly visible to the naked eye: thus Galileo saw one of them in the year 1612; and Mr. Martin assures us, that he knew two gentlemen that thus viewed them within a few years past; whence he concludes, that these spots must therefore subtend, at least, an angle of one minute. Now the diameter of the earth, if removed to the sun, would subtend an angle of but $20''$; so that the diameter of a spot, just visible to the naked eye, is, to the diameter of the earth, as 60 to 20, or as 3 to 1; and, therefore, the surface of the spot, if circular, to a great circle of the earth, is as 9 to 1: but 4 great circles are equal to the earth's superficies; whence the surface of the spot is, to the surface of the earth, as 9 to 4; or as $2\frac{1}{4}$ to 1. Gassendus says, he saw a spot whose diameter was equal to $\frac{1}{20}$ of that of the sun, and therefore subtended an angle at the eye of $1' 30''$; its surface was therefore 5 times larger than the surface of the whole earth. What these spots are, it is presumed, nobody can tell; but they seem to be rather thin substances than solid bodies, because they lose the appearance of solidity in going off the disk of the sun: they resemble something of the nature of lumps or scoria, swimming on the surface, which are generated and dissolved by causes little known to us: but whatever these solar spots are, it is certain they are produced from causes very inconstant and irregular; for Scheiner says he frequently saw fifty at once, but for twenty years after scarce any appeared. And in this century the spots were very frequent and numerous till the year 1741, when, for three years successively, very few appeared; and now, since the year 1744, they have again appeared as usual.

These

These maculæ are not peculiar to the sun, they have been observed in all the planets. Thus venus was observed to have several by signior Blanchini, in the year 1726. As in venus, so in mars both dark and bright spots have been observed, first by Galileo, and afterwards by Cassini, &c. Jupiter has had his spots observable ever since the invention and use of large telescopes. Saturn, by reason of his great distance on one hand, and mercury, by reason of his smallness and vicinity to the sun on the other, have not as yet had any spots discovered on their surfaces, and consequently nothing in relation to their diurnal motions and inclinations of their axis to the planes of their orbits can be known, which circumstances are determined in all the other planets, as well as in the sun, by means of these maculæ. See the articles VENUS, MARS, and JUPITER.

The spots, or maculæ, observable on the moon's surface, seem to be only cavities or large caverns on which the sun shining very obliquely, and touching only their upper edge with his light, the deeper places remain without light; but as the sun rises higher upon them, they receive more light, and the shadow, or dark parts, grow smaller and shorter, till the sun comes at last to shine directly upon them, and then the whole cavity will be illustrated: but the dark, dusky spots, which continue always the same, are supposed to proceed from a kind of matter or soil, which reflects less light than that of the other regions. See MOON.

MAD-APPLE, a name given by some to the solanum. See the article SOLANUM.

MAD-WORT, *alysson*, in botany. See the article ALYSSON.

MADAGASCAR, or *St. LAURENCE*, an island of Africa, situated between 43° and 51° of east longitude, and between 12° and 26° south latitude; three hundred miles south-east of the continent of Africa. It is about a thousand miles in length from north to south, and generally between two and three hundred miles broad. The country is divided among a great number of petty sovereigns.

MADDER, in commerce, is the root of the rubia-plant, for the characters of which, see the article RUBIA.

It is one of the long and small roots, distinguishable from all others by its remarkable red colour, and firm texture; its surface is wrinkled, and in the thickest part it seldom exceeds the bigness of a

goose-quill. It has very little smell; but it has a remarkable taste, it being a mixture of sweet and bitter, together with a manifest astringency.

Madder is cultivated in vast quantities in several parts of Holland; the Dutch supply all Europe with it, and make a great advantage by trading in it. What they send over, for the use of the dyers, is ground into a coarse powder, of which there are two kinds: the one is the whole root ground, and the other is that which is first cleaned from the cortical part, and then ground to a powder; this last is of a paler and more agreeable colour.

This root is an attenuant, and has the credit of being a vulnerary of the first rank. It is given in chronic cases, where there are obstructions of the viscera. It promotes the menses and urine; and is good in jaundices, dropsies, and obstructions of the spleen. Its dose is from five grains to fifteen; but it is seldom given singly. It frequently makes an ingredient in infusions and decoctions, among medicines of the same intention, and gives them an elegant colour.

It is used in great quantities by the dyers, for dying red and other colours: and may be made into a lake, in the same manner as brasil. See *Artificial LACCA*.

MADERAS, some islands situated in the Atlantic ocean, three hundred miles west of Sallee, in Africa, in 16° west longit. and between 32° and 33° of north lat. The largest of them, called Madera, or rather Mattera, by the Portuguese, is about an hundred and twenty miles in circumference, and produces incredible quantities of wine, which has the peculiar quality of keeping best in hot climates, where other wines turn sour.

MADNESS, *mania*, a most dreadful kind of delirium, without a fever.

Melancholy and madness may very justly be considered as diseases nearly allied; for they have both the same origin, that is, an excessive congestion of blood in the brain: they only differ in degree, and with respect to the time of invasion; melancholy being the primary disease, of which madness is the augmentation. Both these disorders suppose a weakness of the brain, which may proceed from an hereditary disposition; from violent disorders of the mind, especially long continued grief, sadness, anxiety, dread, and terror; from close study and intense application of mind to one subject; from narcotic and stupefying medicines; from pre-

vious diseases, especially acute fevers; from a suppression of hæmorrhages, and omitting customary bleeding; from excessive cold, especially of the lower parts, which forces the blood to the lungs, heart, and brain; and from violent anger, which will change melancholy into madness.

It is evident from observation, that the blood of maniac patients is black, and hotter than in the natural state; that the serum separates more slowly and in a less quantity than in healthy persons; and that the excrements are hard, of a dark red or greyish colour, and the urine light and thin.

The antecedent signs of madness are a redness and suffusion of the eyes with blood, a tremulous and inconstant vibration of the eye-lids, a change of disposition and behaviour; supercilious looks, a haughty carriage, disdainful expressions, a grinding of the teeth, and unaccountable malice to particular persons: also little sleep, a violent head-ach, quickness of hearing, incredible strength, insensibility of cold; and, in women, an accumulation of blood in the breasts, in the increase of this disorder.

Diseases of the mind have something in them so different from other disorders, that they sometimes remit for a long time, but return at certain periods, especially about the solstices. It may likewise be observed, that the raving fits of mad people, which keep the lunar periods, are generally accompanied with epileptic symptoms.

This disease, when it is primary or idiopathic, is worse than the symptomatic, that accompanies the hysteric or hypochondriac passion, which is easily cured; as is that also which succeeds intermitting fevers, a suppression of the menses, of the lochia, of the hæmorrhoids, or which is occasioned by narcotics. When the paroxysms are slight in the idiopathic kind, the cure is not very difficult; but if it is inveterate, and has but short remissions, it is almost incurable. Sometimes this disease terminates by critical excretions of blood from the nose, uterus, or anus: sometimes diarrhœas and dysenteries will terminate these disorders; and pustules, ulcers, and the itch have also done the same. As to the cure, bleeding is the most efficacious of all remedies; and where there is a redundance of thick grumous blood, a vein is to be first opened in the foot, a few days after in the arm; then in the jugular vein, or one in the nostrils

with a straw; and last of all the frontal veins, with a blunt-lancet, for fear of hurting the pericranium. Tepid baths made of rain or river-water are also convenient; and before the patient enters the bath, he should have cold water poured on his head. Purgatives are likewise useful; but the lenient are to be preferred to the drastic: thus manna, cassia, rhubarb, cream of tartar, or tartar vitriolate, are most convenient, when the disease arises from the hypochondriac passion, a stagnation of the blood in the intestines, or in the ramification of the vena portæ, especially when taken in decoctions and infusions at repeated intervals, so as to operate in an alterative manner. Some kinds of mineral waters are also highly efficacious in melancholy and madness: but nothing is better for removing the cause of these disorders, than depurated mercury. Particular medicines among vegetables, are baum, betony, vervain, brook-lime, sage, wormwood, flowers of St. John's wort, of the lime tree, and camphire: from animals, ass's blood: among minerals, steel, cinnabar, sugar of lead, and the calx and tincture of silver. Hoffman is of opinion, that nothing better deserves the name of a specific in these diseases than motion and exercise, when duly proportioned to the strength of the body. Sedative medicines are good, but not opiates and narcotics, for these induce stupidity and folly: those that are good in an epilepsy, will be here beneficial, such as castor, shavings of hart's horn, the roots and seeds of piony; antiepileptic powders, the valerian-root, flowers of the lily of the valley and of the lime-tree. Boerhaave says, the principal remedy for raving madness, is dipping in the sea, and keeping the patient there as long as he can bear it. As a high degree of the itch has terminated these disorders, it may be proper to make issues in the back: but blisters (contrary to Shaw's opinion) are prejudicial; for by stimulating the nervous membranes and the dura mater, they increase the spasmodic stricture, and the motion of the gross and bilious blood through the head and the other parts of the body.

As to diet, the patient should carefully abstain from salt and smoked flesh, whether beef or pork; from shell-fish; from fish of a heavy and noxious quality; from aliments prepared with onions and garlic: all which generate a thick blood. He should, in general, eat no more than

is sufficient to support nature. Small beer, or cold pure water, are the best drink; but sweet and strong wines are highly prejudicial, as is also excessive smoking tobacco. Change of air and travelling may be beneficial.

For the madness proceeding from the bite of a mad dog, see HYDROPHOBIA.

MADRAS, a town on the coast of Coromandel, inhabited by blacks, and situated just without the walls of the White-town of Fort St. George. This town has been surrounded by a stone wall by governor Pitt.

MADRE DE POPA, a town and convent of Terra Firma, in South America, situated on the river Grande, fifty miles east of Carthagena, almost as much resorted to by the pilgrims of America, as the chapel of Loretto is by the pilgrims of Europe: west long. 76° , north lat. 11° .

MADREPORA, in botany, a genus of submarine plants, of a stony hardness, but somewhat approaching to the form of other vegetables. It is composed of a main stem, and subdivided into a number of branches, which are full of holes or pores, in a radiated form. See plate CLXX. fig. 1.

MADRID, the capital of the province of New Castile, and of the whole kingdom of Spain: west long. $4^{\circ} 15'$, and north lat. $40^{\circ} 30'$.

It is situated almost in the middle of a large sandy plain, surrounded with high mountains: it is about seven miles in circumference, and contains several grand streets and spacious squares; it has also three royal palaces, called the Palace Royal, the Casa del Campo, and the Buen Retiro.

MADRIER, in the military art, a long and broad plank of wood, used for supporting the earth in mining and carrying on a sap, and in making coffers, caponiers, galleries, and for many other uses at a siege. Madriers are also used to cover the mouths of petards, after they are loaded, and are fixed with the petards to the gates or other places designed to be forced open.

MADRIGAL, in the Italian, Spanish, and French poetry, is a short amorous poem, composed of a number of free and unequal verses, neither confined to the regularity of a sonnet, nor to the point of an epigram, but only consisting of some tender and delicate thought, expressed with a beautiful, noble, and elegant simplicity. The madrigal is usually con-

sidered as the shortest of all the lesser kinds of poetry, except the epigram: it will admit of fewer verses than either the sonnet or the roundelay; no other rule is regarded in mingling the rhimes, and the different kinds of verse, but the fancy and convenience of the author: however this poem allows of less licence than many others, both with respect to rhyme, measure, and delicacy of expression.

MADRIGAL, in geography, a city of the province of Popayan, in South America: west long. $75^{\circ} 30'$, and north lat. $30'$.

MADURA, the capital of a province of the same name in the hither India: east long. 77° , and north lat. 10° .

MÆMACTERION, *μᾶμακτιριον*, in ancient chronology, the fourth month of the Athenian year, consisting of only twenty-nine days, and answering to the latter part of September and the beginning of October.

MÆNA, in ichthyology, the variegated sparus, with a black spot in the middle of the side, and with four large teeth. See the article SPARUS.

MAES, a river which arises in Burgundy, and runs through Lorrain and Champagne into the Netherlands, and at last, after passing by many considerable towns, discharges itself into the German sea, a little below the Briel.

MAESTRICHT, a town in the province of Brabant, situated on the river Maes, thirteen miles north of Liege: east long. $5^{\circ} 40'$, and north lat. $50^{\circ} 55'$.

MAESYCK, a town of Germany, in the bishopric of Liege, sixteen miles north-east of Maestricht.

MAGADOXA, the capital of the territory of the same name, at the mouth of the river Magadoxa, on the coast of Anian, in Africa: east longit. 41° , and north lat. 2° .

MAGAS, in ancient music, the name of two instruments, the one a stringed kind, and the other a kind of flute, which is said to have yielded very high and very low sounds at the same time.

Magas also signifies the bridge of any instrument.

MAGAZINE, a place in which stores are kept, of arms, ammunition, provisions, &c. Every fortified town ought to be furnished with a large magazine, which should contain stores of all kinds, sufficient to enable the garrison and inhabitants to hold out a long siege, and in which smiths, carpenters, wheelwrights, &c. may be employed, in making every thing

thing belonging to the artillery, as carriages, waggons, &c.

MAGDALEN, or *Nuns of St. MAGDALEN*, an order of religious in the romish church, dedicated to St. Mary Magdalen, and sometimes called magdalenettes. These chiefly consist of courtezans, who quitting their profession, devote the rest of their lives to repentance and mortification.

MAGDEBURG, the capital of the dutchy of the same name, situated on the river Elbe, seventy miles west of Berlin: east long. 12° , and north. lat. $52^{\circ} 15'$.

MAGDELENA, a large river of South America, which, rising near the equator, runs north thro' Terra Firma, and uniting its waters with the river Cance, obtains the name of the river Grande, and falls into the north sea, below the town of Madre de Popa.

MAGELLAN STREIGHTS, or rather *Streights of MAGELLAN*. These streights are about three hundred miles in length from the Atlantic to the Pacific ocean, but of a very unequal breadth; and were at first discovered and passed by Ferdinand Magellan, from whom they had their name: they are situated between the island Terra del Fuego and the most southern part of the continent of America, between 76° and 84° of west longitude, and between 52° and 54° of south lat.

Lake of MAGGIORE, is situated partly in the dutchy of Milan, and partly in the country of the Grisons: this lake is thirty-five miles long, and six broad.

MAGI, or **MAGIANS**, an antient religious sect in Persia, and other eastern countries, who maintained, that there were two principles, the one the cause of all good, the other the cause of all evil; and abominating the adoration of images, worshipped God only by fire, which they looked upon as the brightest and most glorious symbol of Oromasdes, or the good God; as darkness is the truest symbol of Arimanius, or the evil god. This religion was reformed by Zoroaster, who maintained that there was one supreme independent being; and under him two principles or angels, one the angel of goodness and light, and the other of evil and darkness: that there is a perpetual struggle between them, which shall last to the end of the world; that then the angel of darkness and his disciples shall go into a world of their own, where they shall be punished in everlasting darkness; and the angel of light and his disciples shall also go into a world of their own, where they

shall be rewarded in everlasting light. See the article **ZEND**.

The priests of the magi were the most skilful mathematicians and philosophers of the ages in which they lived, inso-much that a learned man and a magian became equivalent terms. The vulgar looked on their knowledge as more than natural, and imagined them inspired by some supernatural power: and hence those who practised wicked and mischievous arts, taking upon themselves the name of magians, drew on it that ill signification which the word magician now bears among us.

This sect still subsists in Persia, under the denomination of gaur, where they watch the sacred fire with the greatest care, and never suffer it to be extinguished. See the article **GAURS**.

MAGIC, originally signified only the knowledge of the more sublime parts of philosophy; but as the magi likewise professed astrology, divination, and sorcery, the term magi became odious, being used to signify an unlawful diabolical kind of science, acquired by the assistance of the devil and departed souls. See the articles **ASTROLOGY**, **DIVINATION**, **NECROMANCY**, &c.

Natural magic is only the application of natural philosophy to the production of surprising but yet natural effects. The common natural magic, found in books, gives us only some childish and superstitious traditions of the sympathies and antipathies of things, or of their occult and peculiar properties; which are usually intermixed with many trifling experiments, admired rather for their disguise than for themselves. See the article **EXPERIMENTAL PHILOSOPHY**.

MAGIC LANTERN, in optics. See the article **LANTERN**.

MAGIC SQUARE, in arithmetic, a square figure made up of numbers in arithmetical proportion, so disposed in parallel and equal ranks, that the sums of each row, taken either perpendicularly, horizontally, or diagonally, are equal: thus,

Natural square. Magic square.

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

| | | |
|---|---|---|
| 2 | 7 | 6 |
| 9 | 5 | 1 |
| 4 | 3 | 8 |

Magic squares seem to have been so called, from their being used in the construction of talismans.

MAGISTERY, in chemistry, a very fine powder

powder made by solution and precipitation. Of these there are three kinds mentioned by Quincy, the magistery of antimony, of bismuth, and of calamine.

1. The magistery of antimony is made thus: take of antimony, in very fine powder, four ounces; put it into a large matrafs, pour upon it one pound of aqua regia, by four ounces at a time; set it upon a sand-heat, in a chimney, that the fumes may ascend without offence: let it stand in a heat of digestion ten or twelve hours, shaking it once in two or three hours; then let it cool, and put to it a gallon of spring-water, which pour off before it settles; put to it more water, stir it, and pour it to the other before it settles; repeat this operation till nothing remains in the matrafs but a yellow powder, which is the combustible sulphur of antimony: let the white powder settle, and decant the water, till by several ablutions the magistery becomes insipid: then dry, and keep it for use. This is given in apoplexies, palsies, and all nervous and hypochondriacal distempers: its dose is from five to fifteen grains.

2. Magistery of bismuth is made thus; take spirit of nitre, one pound; and add to it as much powder of bismuth as it is capable of dissolving; then dissolve four ounces of common salt in two gallons of water; filter it, and pour into it the dissolution of bismuth, when it will turn milky, and let fall a precipitate: when it is settled, pour off the water from the magistery; add more fresh water, and continue the ablutions till the magistery becomes insipid; then dry it gently for use. 3. Magistery of calamine is thus made: take calamine, in fine powder, four ounces; put it into a matrafs, and pour upon it spirit of salt, one pound; let them digest upon warm sand, forty-eight hours; filter the dissolution, and precipitate the magistery with spirit of urine; free it from its salt by several ablutions, and dry it gently for use.

MAGISTRATE, any public officer to whom the executive power of the law is committed, either wholly, or in part.

MAGNA ASSISA ELIGENDA, is a writ antiently directed to the sheriff for summoning four lawful knights before the justices of assise, in order to choose twelve knights of the neighbourhood, &c. to pass upon the great assise between such a person plaintiff, and such a one defendant.

MAGNA CHARTA, the great charter of the

liberties of England, and the basis of our laws and privileges.

This charter may be said to derive its origin from king Edward the Confessor, who granted several privileges to the church and state, by charter: these liberties and privileges were also granted and confirmed by king Henry I. by a celebrated great charter, now lost; but which was confirmed or re-enacted by king Henry II. and king John. Henry III, the successor of this last prince, after having caused twelve men to make enquiry into the liberties of England in the reign of Hen. I. granted a new charter, which was the same as the present magna charta; this he several times confirmed, and as often broke; till in the thirty-seventh year of his reign, he went to Westminster-hall, and there, in the presence of the nobility and bishops, who held lighted candles in their hands, magna charta was read, the king all the while holding his hand to his breast, and at last solemnly swearing faithfully and inviolably to observe all the things therein contained, &c. then the bishops extinguishing the candles, and throwing them on the ground, they all cried out, "Thus let him be extinguished, and stink in hell, who violates this charter." It is observed, that notwithstanding the solemnity of this confirmation, king Henry, the very next year, again invaded the rights of his people, till the barons entered into a war against him, when, after various success, he confirmed this charter, and the charter of the forest, in the fifty-second year of his reign. This excellent charter, so equitable and beneficial to the subject, is the antientest written law in the kingdom: by the 25 Edw. I. it is ordained, that it shall be taken as the common law; and by the 43 Edward III. all statutes made against it are declared to be void.

MAGNES ARSENICALIS, ARSENICAL MAGNET. See the article ARSENIC.

MAGNESIA, MANGANESE, in natural history. See the article MANGANESE.

MAGNET, or LOADSTONE, *magnes*, in natural history, a very rich iron ore, found in large detached masses, of a dusky iron-grey, often tinged with brownish or reddish, and when broken appearing something like the common emery, but less sparkling. It is very heavy, considerably hard, of a perfectly irregular and uneven surface, and of a firm structure, but usually with some porous

porous irregularities within. It is found in England, and all other places where there are iron mines.

The primary properties of the loadstone are the following: 1. Every loadstone has two points, called poles, which emit the magnetic virtue. 2. One of these poles attracts, the other repels iron, but no other body. 3. This virtue, being the third species of attraction, is communicated to iron very copiously by the touch, which renders it strongly magnetic. 4. A piece of iron so touched by the loadstone, and nicely suspended on a sharp point, will be determined to settle itself in a direction nearly north and south. 5. The end of the needle touched by the south pole of the stone, will point northwards; and the contrary. 6. Needles touched by the stone, will dip below the horizon, or be directed on the touched part to a point within the earth's surface: this is called the dipping needle. 7. This virtue may also be communicated to iron by a strong attrition all one way. 8. Iron-rods or bars acquire a magnetic virtue by standing long in one position. 9. Fire totally destroys this virtue, by making the stone or iron red-hot. 10. This power is exerted sensibly to the distance of several feet. 11. It is sensibly continued through the substance of several contiguous bodies or pieces of iron. 12. It pervades the pores of the hardest body. And, 13. Equally attracts the iron in vacuo as in open air. These and many more are the properties of a body, not more wonderful than useful to mankind. See POLE, NEEDLE, VARIATION, &c.

There is a very curious method of rendering visible the directions which the magnetic effluvia take in going out of the stone: thus, let AB, CD, (pl. CLXV. fig. 5.) be the poles of the stone; about every side gently strew some steel-filings on a sheet of white paper; these small particles will be affected by the effluvia of the stone, and so posited as to shew the course and direction of the magnetic particles on every part: thus, in the middle of each pole, between AB and CD, it appears to go nearly straight on; towards the sides it proceeds in lines more and more curved, till at last the curved lines from both poles meeting and coinciding, form numberless curves on each side, nearly of a circular figure, as represented in the diagram. This seems to shew that the magnetic virtue emitted from each

pole, circulates to, and enters the other. The law of magnetic attraction seems not yet ascertained. Sir Isaac Newton supposes it to decrease nearly in the triplicate ratio of the distance; but Dr. Helsingham trying the experiment with his loadstone, found it to be as the squares of the distances inversely; and Mr. Martin assures us, that the power of his loadstone decreases in a different manner from either, it being in the sesquiplicate ratio of the distances inversely. For exactness, he made a square bar of iron just a quarter of an inch thick, and then provided three pieces of wood of the same form and thickness exactly; then positing the loadstone very nicely at the end of a balance, which would turn with less than a grain, he placed under it the iron, with first one piece of wood, then two pieces, and lastly all three pieces upon it; by which means the steel-points of the pole were kept at $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, of an inch from the iron; and in those distances the weights put into the opposite scale, to raise the loadstone from the wood (which is touched while the beam was horizontal) were as follows.

| Dist. | Grains. | Ratio of the sq. | Ratio of the cubes. | Sesquip. ratio. |
|---------------|---------|------------------|---------------------|-----------------|
| $\frac{1}{4}$ | 156 | 156 | 156 | 156 |
| $\frac{1}{2}$ | 58 | 39 | 19 | 56 |
| $\frac{3}{4}$ | 28 | 17 | 6 | 30 |

Whence it appears that the number of grains to counteract the power of the loadstone in these distances; approach very near, and are almost the same with those which are in the sesquiplicate ratio, but are widely different from those which are in the duplicate or triplicate ratio; and this experiment Mr. Martin tried several times for each distance, with scarce any variation in the success.

The ingenious Muschenbroek has, with indefatigable pains and application, made experiments of the attractions and repulsions of loadstones in respect to iron and to each other, but could never find any regular proportion in the increase of attraction in their approach to, or decrease of attraction in their recess from one another; only that the force of the magnetic virtue did increase in the approach to, and diminish in the recess from the stone, but not exactly as the distance, nor as the square or cube of the distance, nor as the square or cube of the distance reciprocally; nor in any proportion reducible to numbers; and therefore he very reasonably conjectures, that the repulsions and

and attractions disturb one another, so as to confound the proportions: nor are we able to hope for any other rule concerning this matter, till a way be found, if ever it can be, of separating the attracting from the repelling parts.

The power or force of magnets is generally greater in small than in large ones, in proportion to their bulk. It is very rare that very large ones will take up more than three or four times their own weight, but a small one is but tolerably good that will take up no more than eight, ten, or twelve times its weight. The honourable Mr. Berkeley has one whose weight is but 43 grains, which will take up 1032 grains, which is 24 times its weight; but that of Mr. Newton, which he wears in his ring, weighing scarcely three grains, will take up 746 grains, or 250 times its weight.

The poles of a loadstone are not to be looked upon as two such invariable points as never to change place; for according to Mr. Boyle, the poles of a little bit of magnet may be changed by applying them to the more vigorous poles of another, as has been confirmed by Dr. Knight, who could change at pleasure the poles of a natural magnet, by means of iron-bars magnetically impregnated. Upon gently cutting a magnet through the middle of its axis, each piece becomes a complete magnet; for the parts that were contiguous under the equator before the magnet was cut, become poles, and even poles of different names; so that each piece may become equally a north or south pole, according as the section was made nearer the south or north pole of the large magnet; and the same thing would happen in any other sub-divisions. But upon cutting a magnet longitudinally, there will then be four poles, the same as before the cutting; only that there shall be formed in each piece a new axis parallel to the former, and more or less in the inside of the magnet. We find by experience, that two magnets attract each other by the poles of different denominations; whereas, on the contrary, the two similar poles repel each other. The attraction of a magnet newly dug out of a mine, makes it take up only very small pieces of iron; for which reason it must be armed, in order to augment its force: besides this, the arming it unites, directs, and condenses its virtue towards its poles, and causes its emanations to

tend entirely towards the mass which is laid thereon.

When you have determined where the poles are, which you may exactly find by placing over the magnet a very fine stiff needle, which will stand perpendicular over each pole, and no where else; then you must file it very smooth at its poles, so that the axis shall have the greatest length, yet without too much diminishing its other dimensions. To determine the proportions of the armour, the greater the force of the magnet is, the thicker must the pieces of steel be of which it is to consist; and for this purpose try the magnet with several steel-bars, and the greater weight it takes up with a steel-bar on, that bar is to be its armour. Though the attraction of an armed magnet appears considerable, yet very weak causes destroy its effect in a moment; for instance, when an oblong piece of iron is attracted under the pole of an excellent magnet, and the pole of a different denomination in another magnet that is weaker is presented to the lower end of this piece of iron, this weaker magnet will very strongly take away the iron. In like manner, if the point of a needle be put under one of the poles of a magnet so as to hang by its head, and present to this head any bar of iron by its upper end, the needle will immediately quit the magnet, in order to adhere to the bar; but if the needle hold by its head to the pole of the magnet, then neither the bar of iron nor a weak magnet shall disengage it; and there is another slight circumstance which makes an armed and vigorous loadstone appear to have no more force, and that is the too great length of the iron which is to be raised by one of the poles.

In order to communicate the magnetic virtue effectually, these methods are made use of. 1. It has been discovered, that iron rubbed upon one of the poles of the magnet, acquires a great deal more virtue than from any other part thereof, and this is more considerable from an armed than a naked magnet. 2. The more gently the iron is pressed, and the more it is pressed against the pole, the more magnetical it becomes. 3. It is more convenient to impregnate iron on one pole than on both successively. 4. The iron is much better impregnated by pressing it uniformly and in the same direction, according to its length, than by rubbing it by the middle; and the extre-

mity which touches the pole last, retains the most virtue. 5. A piece of polished steel, or a bit of pointed iron, receives more virtue than a simple piece of iron of the same figure; and, *ceteris paribus*, a piece of iron that is long, small, and pointed, is more strongly impregnated than that of any other form.

The communication of the magnetic virtue, does not sensibly impair that of the loadstone; though it has been observed, that some magnets have communicated a greater power to iron to raise weights, than they had themselves, but without impairing their own force, or adding any thing to the weight of the iron.

As several ways have been proposed for recovering the decayed virtue of loadstones, but to little purpose (especially that of keeping the stone constantly in steel filings) we shall here relate the remarkable experiment of Mr. Haac for this purpose, as it was attended with great success. This gentleman had a magnet weighing fourteen ounces and a half, armed, which would take up sixteen times its own weight; but having laid it by for some years unused, it lost one fourth part of its virtue, or more; whereupon he hung as much weight to the stone as it would sustain, and so left it for some weeks; then returning, he applied more weight to the former, which it very easily bore, and then repeating the addition of more weight at several periods, in the space of about two years, he found that the stone had not only recovered its former strength, but increased it so far as that it would now take up more than twenty pounds, whereas at first it would not take up fifteen.

Artificial MAGNET, a steel-bar impregnated with the virtues of the magnet, so as to possess all the properties, and be used instead of the natural loadstone.

There have been several methods proposed for making artificial magnets, but none has yet met with greater success than that of Mr. Canton, which is as follows: procure a dozen of bars, six of soft steel, each three inches long, one quarter of an inch broad, and one twentieth of an inch thick; with two pieces of iron, each half the length of one of the bars, but of the same breadth and thickness: also six pieces of hard steel, each five inches and a half long, half an inch broad, and three twentieths of an inch thick; with two pieces of iron of half the length, but the whole breadth and

thickness of one of the hard bars: and let all the bars be marked with a line quite round them at one end. Then take an iron-poker and tongs, (plate CLXVI. fig. 1.) (or two bars of iron) the larger they are, and the longer they have been used, the better; and fixing the poker upright between the knees, hold to it, near the top, one of the soft bars, having its marked end downwards, by a piece of sewing silk, which must be pulled tight by the left hand, that the bar may not slide: then grasping the tongs with the right hand, a little below the middle, and holding them nearly in a vertical position, let the bar be stroked by the lower end from the bottom to the top, about ten times on each side, which will give it a magnetic power sufficient to lift a small key at the marked end; which end, if the bar was suspended on a point, would turn towards the north, and is therefore called the north pole, and the unmarked end is for the same reason called the south pole. Four of the soft bars being impregnated after this manner, lay the other two (*ibid.* fig. 2.) parallel to each other, at the distance of one fourth of an inch, between the two pieces of iron belonging to them, a north and a south pole against each piece of iron; then take two of the four bars already made magnetical, and place them together so as to make a double bar in thickness, the north pole of one even with the south pole of the other, and the remaining two being put to these, one on each side, so as to have two north and two south poles together, separate the north from the south poles at one end by a large pin, and place them perpendicularly with that end downward on the middle of one of the parallel bars, the two north poles towards its south, and the two south poles towards its north end: slide them backward and forward three or four times the whole length of the bar, and removing them from the middle of this, place them on the middle of the other bar as before directed, and go over that in the same manner; then turn both the bars the other side upwards, and repeat the former operation: this being done, take the two from between the pieces of iron, and placing the two outermost of the touching bars in their room, let the other two be the outermost of the four to touch these with; and this process being repeated till each pair of bars have been touched three or four times over,

over, which will give them a considerable magnetic power, put the half dozen together after the manner of the four, (*ibid.* fig. 3.) and touch with them two pair of the hard bars placed between their irons, at the distance of about half an inch from each other; then lay the soft bars aside, and with the four hard ones, let the other two be impregnated, (*ibid.* fig. 4.) holding the touching bars apart at the lower end near two tenths of an inch, to which distance let them be separated after they are set on the parallel bar, and brought together again before they are taken off; this being observed, proceed according to the method described above, till each pair have been touched two or three times over: but as this vertical way of touching a bar will not give it quite so much of the magnetic virtue as it will receive, let each pair be now touched once or twice over in their parallel position between the irons (*ibid.* fig. 5.) with two of the bars held horizontally, or nearly so, by drawing at the same time the north of one from the middle over the south end, and the south of the other from the middle over the north end of a parallel bar; then bringing them to the middle again, without touching the parallel bar, give three or four of these horizontal strokes to each side. The horizontal touch after the vertical, will make the bars as strong as they possibly can be made, as appears by their not receiving any additional strength, when the vertical touch is given by a great number of bars, and the horizontal by those of a superior magnetic power. This whole process may be gone through in about half an hour; and each of the large bars, if well hardened, may be made to lift twenty-eight troy ounces, and sometimes more. And when these bars are thus impregnated, they will give to an hard bar of the same size its full virtue in less than two minutes; and therefore will answer all the purposes of magnetism in navigation and experimental philosophy much better than the loadstone, which is known not to have a sufficient power to impregnate hard bars. The half dozen being put into a case (*ibid.* fig. 6.) in such a manner as that two poles of the same denomination may not be together, and their irons with them as one bar, they will retain the virtues they have received: but if their power should, by making experiments, be ever so far impaired, it may be restored with-

out any foreign assistance in a few minutes. And if, out of curiosity, a much larger set of bars should be required, these will communicate to them a sufficient power to proceed with, and they may in a short time, by the same method, be brought to their full strength.

MAGNIFYING, in philosophy, the making of objects appear larger than they would otherwise do; whence convex lenses, which have the power of doing this, are called magnifying glasses; and of such glasses are microscopes constructed. See **LENS** and **MICROSCOPE**.

MAGNITUDE, whatever is made up of parts locally extended, or that hath several dimensions; as a line, surface, solid, &c. See the article **LINE**, &c.

The apparent magnitude of a body is that measured by the visual angle, formed by rays drawn from its extremes to the center of the eye; so that whatever things are seen under the same or equal angles, appear equal; and, *vice versa*. Mr. Mac Laurin observes, that geometrical magnitudes may be usefully considered as generated or produced by motion. Thus, lines may be conceived as generated by the motion of points; surfaces, by the motion of lines; solids, by the motion of surfaces; angles may be supposed to be generated by the rotation of their sides. Geometrical magnitude is always understood to consist of parts; and to have no parts, or to have no magnitude, are considered as equivalent in this science. There is, however, no necessity for considering magnitude as made up of an infinite number of small parts; it is sufficient that no quantity can be supposed to be so small, but it may be conceived to be farther diminished; and it is obvious, that we are not to estimate the number of parts that may be conceived in a given magnitude, by those which, in particular determinate circumstances, may be actually perceived in it by sense, since a greater number of parts become sensible, by varying the circumstances in which it is perceived.

For the different magnitudes of the fixed stars, see the article **STAR**.

MAGNOLIA, the **LAUREL-LEAVED TULIP-TREE**, in botany, a genus of the polyandria-polygamia class of plants; the corolla of which consists of nine oblong, hollow, and obtuse petals, narrowest toward the base: the fruit is an oval siliqua, composed of compressed, roundish, acute, and clustered capsules, which are

unilocular, and contain a single kidney-shaped seed.

Could this beautiful tree be so far naturalized as to endure the cold of our severe winters, it would make one of the greatest ornaments of our gardens. It is propagated by seeds, which should be procured from Carolina.

MAGPY, in ornithology, a species of *corvus*, with a cuneiform tail. See the article **CORVUS**.

This is a very well known bird, and when in full feather, and in its wild state, has a great deal of beauty; the size is about that of the jack daw; but its variegated wings and length of tail make it seem longer.

MAHOMETANS, those who believe and practise the religion of Mahomet.

The fundamental position on which Mahomet erected the superstructure of his religion, was, that there has been from the beginning of the world but one true orthodox belief, which consists in acknowledging one only true God, and obeying such of his messengers and prophets as he has from time to time sent into the world, to reveal his will to mankind. Upon this foundation he set up for a prophet to extirpate idolatry, which was the religion of the Arabs, his countrymen, and to reform the other abuses crept into religion. The whole substance of his doctrine he therefore comprehended in these two principal articles of faith, "There is but one God, and Mahomet is his prophet;" in consequence of which last article, all such ordinances and institutions as he thought fit to establish, were to be received as obligatory and of divine authority.

The mahometans divide their religion into two general parts, faith and practice; of which the first is divided into six distinct branches; belief in God, in his angels, in his scriptures, in his prophets, in the resurrection and final judgment, and in God's absolute decrees. The points relating to practice are, prayer, with washings, &c. alms, fasting, pilgrimage to Mecca, and circumcision. In regard to these practical points, Mahomet, it is said, declared, that the practice of religion is founded upon cleanliness, which is one half of faith and the key of prayer. Alms-giving is thought to be so pleasing in the sight of God, that the caliph Omar Ebn Abdalaziz used to say, prayer carries us half way to God; fasting brings us to the door of his pa-

lace; and alms procure us admission; and Mahomet himself used to say of fasting, that it was the gate of religion; and the odour of the mouth of him who fasteth is more grateful to God, than that of musk. Besides these they have some negative precepts and institutions of the koran, in which several things are prohibited, as usury, the drinking of wine, all games that depend upon chance, the eating of blood and swine's flesh, and whatever dies of itself, is strangled, or is killed by a blow or by another beast. These doctrines and practices Mahomet established by the sword, by preaching, and by the alcoran or koran, which contains the principles of his religion; and he and his followers met with such success, as in a few years to subdue half the known world. See **ALCORAN**.

MAIDEN, an instrument used in Scotland for beheading criminals.

This is a broad piece of iron about a foot square, very sharp on the lower part, and loaded above with a very heavy weight of lead. At the time of execution it is pulled up to the top of a narrow wooden frame, about ten feet high, and as broad as the engine, with mouldings on each side for the maiden to slide in. A convenience is made about four feet from the ground, for the prisoner to lay his neck; and there is a kind of bar so fastened as to keep him from stirring. The prisoner being thus secured, and the sign given, the maiden is let loose, which in a moment separates his head from his body.

MAIDEN ASSIZE, an assize in which no person is condemned to die.

MAIDEN RENTS, was a noble formerly paid in some manors by a tenant to his lord, for his passing by the custom of marcheta, by which he was to have the first night's lodging with his tenant's wife: tho' it is thought to signify a fine paid for a licence to marry a daughter.

MAIDENHEAD, a market-town in Berkshire, twelve miles north-east of Reading.

MAIDSTONE, the county town of Kent, situated on the Medway, twenty-two miles west of Canterbury; east long. 37', north lat. 51° 20'. It sends two members to parliament.

MAJESTY, a title given to kings, which frequently serves as a term of distinction. Thus the emperor is called sacred majesty, imperial majesty, and caesarian majesty; the king of France is called his most christian majesty, and when he treats with

with the emperor, the word sacred is added; and the king of Spain is termed his most catholic majesty: with respect to other kings, the name of the kingdom is added, as his britannic majesty, his polish majesty, &c. Formerly princes were more sparing in giving titles, and more modest in claiming them; before the reign of Charles V. the kings of Spain had only the title of highness; and before that of Henry VIII. the kings of England were only addressed under the title of grace and highness.

MAIL, or *coat of MAIL*, a piece of defensive armour for the body, made of small iron rings, interwoven in the manner of a net.

Black MAIL, in our old customs. See the article ALBA FIRMA.

MAIM, **MAIHEM**, or **MAYHEM**, in law, a wound by which a person loses the use of a member that might have been a defence to him, as when a bone is broken, a foot, hand, or other member cut off; or an eye put out; though the cutting off an ear or nose, or breaking the hinder teeth, was formerly held to be no maim. A maim by castration was antiently punished with death, and other maims with loss of member for member: but afterwards they were only punished by fine and imprisonment. It is now enacted, by the statute of 22 and 23 Car. II. that if any person from malice aforethought, shall disable any limb or member of any of the king's subjects with an intent to disfigure him, the offender, with his aiders and abettors, shall be guilty of felony without benefit of clergy; tho' no such attainder shall corrupt the blood, or occasion forfeiture of lands, &c.

MAINE, a river of Germany, which rises on the east side of the circle of Franconia, and running from east to west, discharges itself into the Rhine at Mentz.

MAINE is also the north-west part of the province of Orleans, in France.

MAINE is also a province of New England, bounded by Nova-Scotia, on the north-east; by Massachusetts-bay, on the south; and by the province of New Hampshire, on the south-west and north-west.

MAINLAND, the chief of the islands of Shetland, in the county of the Orcades in Scotland.

MAINPRISE, in law, is the receiving a person into friendly custody, who might otherwise be committed to prison, on security given that he shall be forth-coming at a certain time and place appointed.

There is a difference between bail and mainprise, for a person mainprised is said to be at large from the day of his being mainprised, till the day of his appearance, and is not liable to be confined by his sureties: but when a person is let to bail by a judge, &c. till a certain day, he is in law always accounted in the ward of his bail during the time, and they may, if they please, keep him in prison.

MAINTENANCE, in law, is an unlawful maintaining or supporting a suit between others, by stirring up quarrels, or interfering in a cause in which the person has no concern. Thus if any person disinterested in a cause officiously gives evidence, or opens the evidence in a suit, without being called upon for that purpose, or acts the part of counsel, by speaking in the cause, or retains an attorney for the party, he is guilty of maintenance, and is liable to be prosecuted by indictment. It is no maintenance, where a person gives a poor man money out of charity to carry on a suit: and attorneys may lawfully disburse their money for their clients, in expectation of being paid again; but they must not do it at their own expence, on the condition of no purchase no pay.

MAJOR, in the art of war, the name of several officers of very different ranks and functions; as, 1. Major-general, the next officer to the lieutenant-general: his chief business is to receive the orders from the general, or in his absence from the lieutenant-general of the day; which he is to distribute to the brigade-majors, with whom he is to regulate the guards, convoys, and detachments. When there are two attacks at a siege, he commands that on the left. He ought to be well acquainted with the strength of each brigade, of each regiment in particular, and to have a list of all the field officers. In short, he is in the army, what a major is in a regiment. He is allowed an aid de camp, and has a serjeant and fifteen men for his guard. 2. Major of a brigade, the officer who receives the orders from the major-general, and afterwards delivers them to the adjutants of the regiments at the head of the brigade; where he takes and marches the detachments, &c. to the general rendezvous. He ought to be an expert captain, to know the state and condition of the brigade, and keep a roll of the colonels, lieutenant-colonels, majors, and adjutants. 3. Major of a regiment, the next

next officer to the lieutenant-colonel, generally promoted from the oldest captain. He is to take care that the regiment be well exercised, to see it march in good order, and to rally it in case of its being broke. He is the only officer among the foot that is allowed to be on horseback in time of action, that he may the more readily execute the colonel's orders, either in advancing or drawing off the regiment. 4. Major of a regiment of horse, is the first captain, who commands in the absence of the colonel. 5. Town-major, the third officer in a garrison, being next to the deputy-governor. He ought to understand fortification, and hath charge of the guards, rounds, patrols, &c. His business is also to take care that the soldiers arms are in good order; he likewise orders the gates to be opened and shut, and gives the governor an account of all that passes within the place.

There are also aids-major, drums-major, &c. so called from their preheminance above others of the same denomination.

MAJOR, in law, a person who is of age to manage his own affairs. See the articles AGE and MINOR.

MAJOR, in logic, the first proposition of a syllogism. See the article SYLLOGISM.

MAJOR and MINOR, in music, signify imperfect concords, which differ from each other by a semi-tone minor. See the article CONCORD.

MAJOR-DOMO, an appellation formerly given to the steward or master of the king's household.

MAJORANA, MARJORAM, in botany, is comprehended by Linnæus among the organums. See ORIGANUM.

Marjoram is attenuant and detergent, and recommended in nervous cases, and diseases of the lungs, as also in epileptic cases.

MAJORCA, the capital of a Spanish island of the same name: east long. $2^{\circ} 30'$, north lat. $39^{\circ} 30'$.

This island is in the Mediterranean Sea, about sixty miles long, and forty-five broad, situated about eighty miles south of the coast of Catalonia, and an hundred miles east of Valencia.

MAJORITY, the greater number of persons. Several things are determined by a majority. Thus our laws are enacted by a majority of members of parliament, and the members themselves are chosen by a majority of electors: also the act of the major part of every corporation, is

accounted the act of the corporation; for where the majority is, there the law adjudges to be the whole.

MAIRE, or *streights of le MAIRE*, is a passage to Cape Horn, situated between Terra del Fuego in South America, and Staten island; which being discovered by Le Maire, obtained his name.

MAIZ, or INDIAN CORN, a plant called by Linnæus *zea*. See the article ZEA.

MAKE, in law, is to perform and execute. Thus to make his law, is to perform that law by which a man had formerly bound himself; and to make services and customs, means no more than to perform them.

MAKING-UP, among distillers, the reducing spirits to a certain standard of strength, usually called proof, by the admixture of water; which should be either soft and clear river-water, or spring-water rendered soft by distillation. See the articles LOWERING and PROOF.

MALA, the cheek, in anatomy. See the article CHEEK.

The cheeks are composed of two bones of a hard substance, called by anatomists *ossa malarum*, *ossa jugalia*, or *zygomatice*. See FACE, MAXILLA, &c.

MALABAR, the south-west coast of the peninsula of hither India, about 400 miles long, and 100 broad, bounded by Vishiapour, on the north; by the mountains of Baligate, on the east; and by the Indian ocean on the west and south.

MALACCA, the most southerly part of the further peninsula of India, about 600 miles long, and generally about 200 miles broad; bounded by Siam, on the north; by the bay of Siam and the Indian ocean, on the east; and by the streights of Malacca, on the south-west. The capital of this country, which is also commonly called Malacca, is situated in 100° of east long. and $2^{\circ} 30'$ north lat.

MALACHI, or *the prophecy of MALACHI*, a canonical book of the Old Testament, and the last of the twelve lesser prophets. Malachi prophesied about three hundred years before Christ, reproving the Jews for their wickedness after their return from Babylon, charging them with rebellion, sacrilege, adultery, prophane-ness, and infidelity, and condemning the priests for being scandalously careless in their ministry: at the same time not forgetting to encourage the pious few, who, in that corrupt age, maintained their integrity. This prophet distinctly points at

at the Messiah, who was suddenly to come to his temple, and to be introduced by Elijah the prophet, that is, by John the baptist, who came in the spirit and power of Elias or Elijah.

MALACHITES, or **MOLOCHITES**, in natural history, &c. a species of jasper, supposed to be possessed of amuletic virtues. See **JASPER** and **AMULET**.

MALACIA, *μαλακία*, in medicine, is a languishing disorder incident to pregnant women, in which they long sometimes for one kind of food, and sometimes for another, and eat it with an extraordinary greediness. When women labouring under this disorder begin to abstain from the improper and absurd things they were fond of, and with less reluctance use laudable and wholesome aliments, it is an infallible sign of a beginning cure and approaching health. Pregnant women are generally freed from the malacia, about the fourth month; but if it continues longer it is dangerous, because the peccant humours are deeply rooted. For the cure of this disorder, in pregnant women, but few medicines are recommended for fear of abortion: however gentle medicines may be used for evacuating and corroborating the stomach. In young women labouring under a chlorosis, this distemper is cured by the same medicines that are proper for removing the chlorosis. See the article **CHLOROSIS**.

MALACOPTERYGIOUS, among ichthyologists, an appellation given to one of the five orders of fishes, from their having the rays of their fins bony, but not pointed or sharp at the extremities, like those of acanthopterygious fishes. See the articles **FISH** and **ICHTHYOLOGY**.

MALACOSTOMOUS FISHES, those destitute of teeth in the jaws, called in english leather-mouthed: as the tench, carp, bream, &c. See **TENCH**, &c.

MALACOSTRACA, in zoology, the same with crustaceous animals.

MALAGA, a city and port of Spain, in the province of Granada, situated in the Mediterranean, sixty-six miles north-east of Gibraltar: west long. $4^{\circ} 45'$, north lat. $36^{\circ} 40'$.

MALAGMA, a cataplasm. See the article **CATAPLASM**.

MALAMOCCA, a small island and port-town in the lagunes of Venice, situated five miles south of that city.

MALANDERS, a disease incident to horses, proceeding from corrupt blood, hard labour, or being over-ridden, and

sometimes for want of clean keeping and rubbing. It consists of certain chops or chinks which appear on the inside of the fore legs, just against the bending of the knee, which discharge a red, sharp, pungent water. The surest method of cure is to wash the part very clean with urine, or oil of nuts shaken with water, and then to mingle equal quantities of linseed-oil and aqua-vitæ, stirring and shaking them till the mixture grows white, with which anoint the part once a day.

MALDIVA ISLANDS, are about a thousand small islands, in the Indian ocean, 500 miles south-west of the continent of the hither India, extending from the second degree of south latitude, to the seventh degree of north latitude.

MALDON, a port-town of Essex, ten miles east of Chelmsford. It sends two members to parliament.

MALE, *mas*, among zoologists, that sex of animals which has the parts of generation without the body. See the articles **ANIMAL** and **GENERATION**.

The term male has also, from some similitude to that sex in animals, been applied to several inanimate things: thus we say, a male-flower, a male-screw, &c. See the articles **FLOWER** and **SCREW**.

MALE BALSAM, *momordica*, in botany. See the article **MOMORDICA**.

MALICE, in law, is a premeditated design to do mischief to another.

Malice is necessary to constitute the crime of murder. So where a person has a malicious intent to kill, and in the execution of this malicious design kills a third person by accident, he is, on account of his malice, deemed guilty of murder. See the article **MURDER**.

MALIGNANT, among physicians, a term applied to diseases of a very dangerous nature, and generally infectious: such are the dysentery, hospital-fever, &c. in their worst stages. See **DYSENTERY**, **HOSPITAL-FEVER**, **PETECHIÆ**, &c.

MALINES, or **MECHLIN**. See the article **MECHLIN**.

MALL, or **SEA-MALL**, in ornithology, the english name of the lesser gull, with a grey back and spotted neck, and about the size of the common tame pigeon. See the article **LARUS**.

There is also another species called by the name of mall, as large as a pullet.

MALLEABLE, a property of metals, whereby they are capable of being extended under the hammer. See the articles **DUCTILITY** and **METAL**.

MALLE-

MALLEOLUS, in anatomy, a name given by anatomists to the inferior extremities of the tibia and fibula.

MALLET, a kind of large wooden hammer used by artificers who work with a chissel, as sculptors, masons, and stone-cutters, whose mallets are commonly round, and by joiners, carpenters, &c. who work with square-headed mallets.

MALLEUS, in anatomy, a bone of the ear, so called from its resemblance to a mallet, and in which is observed the head, the neck and handle, which is joined to the membrane of the tympanum. See **EAR**.

MALLING, a market-town of Kent, five miles west of Maidstone.

MALLO, a town of Ireland, in the county of Cork, seventeen miles north of Cork city.

MALLOW, **MALVA**, in botany. See the article **MALVA**.

Vervain **MALLOW**. See **ALCEA**.

MALMEDY, a town of Germany, in the circle of Westphalia, and bishopric of Liege; nine miles south of Limburgh.

MALMOE, a port-town of Sweden, in the province of Gothland, twenty miles south-east of Copenhagen.

MALMSBURY, a borough-town of Wiltshire, thirty miles south-west of Salisbury; it sends two members to parliament.

MALMSEY, a rich kind of wine, so called, as being brought from Malvasia, in the Morea; for the duty on which see the article **WINE**.

MALO, or **St. MALO**, a city and port-town of France, in the province of Brittany, situated on a rock, in the english channel, but joined to the continent by a causeway: west long. 2° , north lat. $48^{\circ} 40'$.

MALOPE, *betony-leaved* **MALLOW**, in botany, a genus of the monadelphia-polyanthia class of plants, the flower of which is like that of the common malva: the fruit is composed of a number of conglomerated capsules, each containing a single kidney shaped seed.

MALPAS, a market-town of Cheshire, ten miles south-east of Chester.

MALPIGHIA, in botany, a genus of the decandria-trigynia class of plants; the flower of which is composed of five large, hollow, kidney-shaped petals, with long and linear unguis: the fruit is a large globose berry, with one cell, containing three osseous, oblong, obtuse, and angulated seeds; each having an oblong, and obtuse kernel.

MALPLAQUET, a village in the austrian

Netherlands, in the province of Hainault, about seven miles from Mons.

MALT, is barley prepared, to fit it for making a potable liquor called beer, or ale, by stopping it short at the beginning of vegetation.

In making malt from barley, the usual method is to steep the grain in a sufficient quantity of water, for two or three days, till it swells, becomes plump, somewhat tender, and tinges the water of a bright brown, or reddish colour. Then this water being drained away, the barley is removed from the steeping cistern to the floor, where it is thrown into what is called the wet couch; that is, an even heap, rising to the height of about two feet. In this wet couch, the capital part of the operation is performed; for here the barley spontaneously heats, and begins to grow, shooting out first the radicle, and if suffered to continue, then the plume, spire or blade. But the process is to be stopped short at the eruption of the radicle, otherwise the malt would be spoiled. In order to stop it, they spread the wet couch thin over a large floor, and keep turning it once in four or five hours, for the space of two days, laying it somewhat thicker each time. After this, it is again thrown into a large heap, and there suffered to grow sensibly hot to the hand, as it usually will in twenty or thirty hours time; then being spread again, and cooled, it is thrown upon the kiln, to be dried crisp without scorching.

This is the general process of malting, in which almost every maltster has his secret, or particular way of working. But to render the operation perfect, the following cautions must be observed:

1. That the barley be newly thrashed, or at least newly winnowed.
2. That it be not mixed, or made up of different sorts.
3. That it be not over steeped in the cistern, or so long as to make it soft.
4. That it be well drained.
5. That it be carefully looked after in the wet couch, so as to stop the first tendency of the blade to shooting.
6. Another caution is, to turn the wet couch inside outmost, if the barley comes, and shoots more in the middle of the heap than on the sides.
7. To keep it duly turning, after it is out of the wet couch.
8. To give it the proper heating in the dry heap.
9. To dry and crisp it thoroughly upon the kiln, but without a fierce fire, so as to be several days in drying a kiln

of pale malt. And if these directions be carefully observed, the malt will always be good.

The method of malting indian corn or Virginia-wheat, is much less laborious. For, if this corn be buried two or three inches deep in the earth, and covered with the loose mould, dug up to make room for it, in ten or twelve days time the corn will sprout, and appear like a green field; at which time being taken up, and washed or fanned from its dirt, it is immediately committed to the kiln, and by this means it becomes good malt. It is observable of this corn, that both its root and blade must shoot to a considerable length, before it will make malt; and, perhaps, this is the case in all large bodied grain.

The importation of malt from beyond the seas is prohibited: and on its being exported, it is not only freed from paying the excise of 6d. a bushel, but a bounty is allowed by act of parliament, for which see the article CORN.

Malt-liquors have different names, and different virtues, from the different methods of preparing the malt, whence they are distinguished into pale and brown; and from the various methods taken in brewing the liquors, whence they are divided into ale and beer, strong and small, new and old. See BREWING

The colour of the liquor, and many of its effects, depend on the manner of drying the malt it is brewed with; that which has the palest tinge, is made with malt but slenderly dried; whereas that which is high coloured, is made with malt that is high dried, or roasted, as it were, in comparison of the other; and amber-ale is made of a mixture of both. Another difference in the preparations of malt-liquors consists in the larger quantity of hops in beer, and the smaller in ale; for hops add something of an alkaline nature to the liquor, and not only render it more easy of digestion, and secretion in the body, but while it is in the liquor, prevent its running into such cohesions, as would make it ropy, vapid and sour: for this reason Dr. Quincy is of opinion, that for one constitution injured by beer, there are numbers spoiled by ale, which is apt to stuff the vessels with slime and viscosity, to make the body unwieldy and corpulent, and to pave the way for cachexies, the jaundice, althmas, and the dropsy. The different degrees of strength in malt-liquors, also

make them produce different effects. The stronger they are, the more viscid parts they carry into the blood: they are therefore in general the more wholesome for being small; that is, of such a strength as to carry some degree of warmth into the stomach, but not so as to prevent their being proper diluters of our necessary food. Indeed people of robust constitutions, who labour very hard, may dispense with reasonable quantities of the strongest; especially as their food is frequently poor and slender enough, the deficiencies of which this supplies; and their continual exercise and strength of body, digests and breaks the viscidities of the drink into convenient nourishment: though in persons of another habit, and way of living, they would only produce obstructions and ill humours. As to the age of these liquors, it has somewhat the same effect as hops, for those that are longest kept, are certainly least viscid: for age, by degrees, breaks their viscid parts, and by rendering them smaller, makes them fitter for secretion.

MALT-SPIRITS. See the articles DISTILLERY and SPIRIT.

MALTA, the capital of a small island of the same name in the Mediterranean, is situated in east long. 15°, north lat. 35° 15'; consisting of three towns, separated by channels, which form so many peninsulas of solid rock, rising a great height above the sea: the situation is strong, and no art is wanting in the fortifications to render it impregnable.

Knights of MALTA, otherwise called, *hospitallers of St. John of Jerusalem*, a religious military order, whose residence is in the island of Malta. The order consists of three estates, the knights, chaplains, and servants at arms: there are also priests who officiate in the churches, friar-servants, who assist at the offices, and donnes or demicroffes; but these are not reckoned constituent parts of the body: the government of the order is mixt, being partly monarchical, and partly aristocratical: the grand master is sovereign. The knights formerly consisted of eight different languages, but now only seven, the english having withdrawn themselves. None are admitted into this order but such as are of noble birth: the knights are of two sorts, those who have a right to be candidates for the dignity of grand master, called grand crosses, and those who are only knights

assistants: they never marry, yet have continued from 1090 to the present time. The knights are received into this order either by undergoing the trials prescribed by statutes, or by dispensation.

Earth of MALTA. See the article BOIE.

MALTHA, in antiquity, a kind of cement, of which there were two sorts, native and factitious; one of the latter sort, much in use, consisted of pitch, wax, plaster, and grease. Another kind used by the Romans in their aqueducts, was made of lime slacked in wine, incorporated with melted pitch, and fresh figs. Natural maltha is a kind of bitumen, wherewith the Asiatics plaster their walls; and which being once set on fire, water makes it burn more fiercely.

MALTON, a borough of Yorkshire, situated on the river Derwent, twenty miles north-east of York. It sends two members to parliament.

MALVA, **MALLOW**, in botany, a genus of the monadelphia-polyandria class of plants, the corolla whereof consists of five petals, vertically cordated, plane, and growing together at the base; the fruit consists of a great number of capsules, joined together by an articulation, and of an orbicular depressed figure, separating from one another, and opening inwardly: the receptacle affixed to the capsules is columnar: the seed is solitary and kidney-shaped.

Mallow is one of the five emollient herbs, being loosening, cooling, and mollifying; a cataplasm of the leaves of this plant eases the sting of bees and wasps.

MALVASIA, or **NAPOLI DE MALVASIA**, a city and port-town of European Turkey, in the province of Morea, situated in the Archipelago, thirty miles east of Misitra.

MALUS, the **APPLE-TREE**, in botany, is, according to Linnæus, a species of the pyrus. See **APPLE** and **PYRUS**.

MAMALUKES, the name of a dynastie that reigned in Egypt.

The mamalukes were originally turkish and circassia-slaves, bought of the Tartars by Melicsaleh, to the number of a thousand, whom he bred up to arms, and raised some to the principal offices of the empire. They killed sultan Moadam, to whom they succeeded.

Others say, that the mamalukes were ordinarily chosen from among the christian slaves, and that they were the same thing in a great measure with the janissaries among the Turks. They never married;

they first are said to have been brought from Circassia, and some have supposed that they began to reign about the year 869.

MAMMÆ, the **BREASTS**, in anatomy. See the article **BREAST**.

MAMMEA, in botany, a genus of the polyandria-monogynia class of plants, the corolla whereof consists of four roundish concave patent petals, greater than the cup: the fruit is a carnosse berry, very large, pointed, with the style of a spherical figure, and containing only one cell: the seed, being either four or one in number, is callous, and of an oval figure.

MAMMIFORM, in anatomy, a name given to apophyses of the bone in the back part of the skull, so called from their resembling a breast.

MAMMILLARY, **MAMMILLARIS**, in anatomy, an epithet given to two little protuberances, somewhat resembling the nipples of the breast, found under the four ventricles of the brain, and supposed to be the organs of smelling. These are called apophyses mammillares. There is also a muscle called mamillaris, or mastoides, serving to stoop the head.

MAMMOTH'S TEETH, in natural history, certain large fossile teeth, found in great plenty in Russia, and supposed to have belonged to elephants.

MAN, *homo*, in zoology, is justly ranked at the head of the animal part of the creation; making a distinct genus of that order of quadrupeds, which Linnæus calls anthropomorpha, from their resemblance to the human form. See the article **ANTHROPOMORPHA**.

The same author distinguishes the race of mankind, according to their different colours, into the Europeans; or white men; the Americans, or ruddy-coloured men: the Asiatics, or tawney-coloured men; and those of Africa, or blacks.

Nosce te ipsum, know thyself, is a precept worthy of the law-giver of Athens, the antient seat of polite literature; an important branch of knowledge, which may be reduced to the following heads.

1. In a religious view, *theologicè*, that you was created with an immortal soul, after the image of God.
2. In a moral sense, *moraliter*, that you alone was blessed with a rational soul, to be employed to the praise of the creator.
3. With respect to the other works of the creation, *naturaliter*, that you are constituted their lord, for whose use they were made.
- 4.

In a physiological sense, *physiologicè*; the most perfect and amazing fabric of your body. 5. With regard to diet, *diæticè*, what things are useful, and what hurtful, in this respect. 6. In a pathological sense, *pathologicè*, how frail you are, and how subject to a thousand calamities.

These are the heads, which, according to Linnæus, comprehend the knowledge of man, considered as an individual; a branch of knowledge so essential to the human race, that, without it, he seems to doubt whether any other characters be sufficient to entitle one to be ranked among mankind: for he adds, *Hæc si no-veris, Homo es, et a reliquis animalibus distinctissimum genus.*

The whole of this work may, in some respect, be accounted an analysis of MAN; as comprehending his knowledge of God, of himself, and of natural and artificial objects. See the INTRODUCTION.

We have traced him from his conception to his birth, infancy, puberty, married state, old age, and death. We have considered him as a parent, a child, and a member of society, in all the various situations and connections of human life. We have anatomized, so to speak, his mental faculties no less than the members of his body. In short, to give a just notion of mankind, and of their personal and social capacities, of their manners, customs, opinions, advantages and disadvantages, has been our study through the whole of this work; which, being reduced to the form of a dictionary, may, with the greatest ease, be consulted at pleasure, on whatever subject the reader desires to be informed.

As to the articles which more immediately concern mankind, the reader may turn to GENERATION, FOETUS, INFANT, PUBERTY, MARRIAGE, DIET, DISEASE, MORTALITY, KNOWLEDGE, REASON, &c.

MANAGE, or MANEGE. See MANEGE. MANAR, an east indian island, situated between Ceylon and the continent.

MANCHA, a territory of Spain, in the province of New Castile.

MANCHE, the french name for the english Channel.

MANCHESTER, a large town of Lancashire, forty miles south-east of Lancaster.

MANDAMUS, in law, a writ that issues out of the court of king's bench, sent to a corporation, commanding them to admit or restore a person to his office. This writ also lies where justices of the

peace refuse to admit a person to take the oaths, in order to qualify himself for enjoying any post or office; or where a bishop or archdeacon refuses to grant a probate of a will, to admit an executor to prove it, or to swear a church-warden, &c.

MANDARINS, a name given to the magistrates and governors of provinces in China, who are chosen out of the most learned men, and whose government is always at a great distance from the place of their birth. Mandarin is also a name given by the Chinese to the learned language of the country; for besides the language peculiar to every province, there is one common to all the learned in the empire, which is in China what latin is in Europe; this is called the mandarin tongue, or the language of the court.

MANDATE, in law, a judicial commandment to do something. See the article MANDAMUS.

MANDATE, in the canon-law, a rescript of the pope, commanding an ordinary collator to put the person therein-named in possession of the first vacant benefice in his collation.

MANDERSCHEIT, a city of Germany, in the electorate of Triers, and the capital of the county of Manderscheit: east long. $6^{\circ} 32'$, north lat. $50^{\circ} 20'$.

MANDRAGORA, MANDRAKE, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of a single erect hollow petal, growing gradually wider from the base; being a little larger than the cup, and divided beyond the middle into five lanceolated segments: the fruit is a great globose berry, containing two cells: the receptacle is fleshy and convex on both sides: the seeds are numerous and kidney shaped. The mandragora has been esteemed a poison, by many; and by others, it is declared innocent: the bark of the root was once used as a narcotic; but at present the leaves are only used in medicine.

MANFREDONIA, a city and port of the kingdom of Naples, situated in the bay of Manfredonia, in the gulph of Venice: east long. $16^{\circ} 40'$, north lat. $41^{\circ} 20'$.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe, of which there are several kinds, as the flat mandrels, which have three or more little pegs or points near the verge, and are used for turning flat boards on; the pin mandrel are those which have a long wooden shank to fit into a large hole

made in the work to be turned; hollow mandrels are those hollow of themselves, and used for turning hollow work; screw mandrels for turning screws, &c.

MANE, the hair hanging down from a horse's neck, which should be long, thin, and fine; and if frizzled, so much the better.

MANEGE, or **MANAGE**, the exercise of riding the great horse, or the ground set apart for that purpose; which is sometimes covered, for continuing the exercise in bad weather; and sometimes open, in order to give more liberty and freedom both to the horseman and horse.

One way or other, we always suppose a center in the middle of the manege-ground, for regulating the rounds and volts. Sometimes this center is distinguished by a pillar fixed in it, to which they tie the horse when he begins to learn: upon the side of the manege other pillars are placed, two by two, in order to teach horses to raise the fore-quarters, by tying them with ropes. See **PILLAR**.

The manege or exercise of a horse, is a particular way of working or riding him. Make your horses work upon the air and the manege that you used to put them most to. A horse is said to manege, when he works upon volts and airs, which supposes him broke and bred. A horse is said to be thoroughly maneged, or a finished horse, that is well broke and bred, and confirmed in a particular air or manege. High manege, is the high or raised airs which are proper for leaping horses.

In choosing a horse for the manege, make choice of a horse of a middle size, that is lively, full of spirit and action, short trussed, well coupled, having good feet and legs, and shoulders very easy and supple. It ought also to be observed, that horses that have thick, stiff, and short joints, that is no ways flexible or pliant, are unfit for the manege; for glib and bending joints, if they be not too long, are one of the chief qualities requisite in a fine and delicate horse of manege.

As for the age most proper to begin to work a horse designed for the manege, he should not be too young, not only because his apprehension is not yet come to him, but also because a horse of three years old being but a gristle, stopping and going back will spoil him, by straining his back and stretching his hams,

MANES, in the pagan system of theology, a general name for the infernal deities, or gods of hell.

The antients comprehended under manes not only Pluto, Prosperine, and Minos, but the souls likewise of the deceased were taken into the number, and esteemed gods of hell. It was usual to erect altars and offer libations to the manes of deceased friends and relations. One branch of the magic art among the pagans consisted in consulting the manes of the dead in matters of importance: this was called Necromancy. See **NECROMANCY**.

MANGALOR, or **MANGUELOR**, a port-town of the Hither India, situated on the Malabar-coast, in east long. 74°, north lat. 13°.

MANGANESE, **MAGNESIA**, in natural history, a poor kind of iron-ore. See the article **IRON**.

It is a dense, heavy substance in its finest pieces; being composed of a number of broad and thick striæ irregularly laid together, and much resembling those of native antimony; in these masses it is sometimes reddish, sometimes of a dark grey, and sometimes of a fine pale light grey, approaching to the colour of the finest polished iron: but there is a less perfect kind in which the whole mass seems only to consist of a number of irregularly figured pieces, of a brittle and somewhat glossy ore, blended very loosely together.

Manganese is found in great abundance in the german and swedish mines, as also in France, Italy, and England; but ours is not equal in beauty or goodness to the german. It is recommended by authors as an astringent, and ordered to be given after calcination in hæmorrhages; but it is very improper for internal use. It is of great service, however, to the glassmen, in clearing away the greenish colour from their white glass while in fusion. See **GLASS**.

MANGIFERA, in botany, a genus of the pentandria-monogynia class of plants, the calyx of which is a five-leaved perianthium; the corolla consists of five spear-shaped petals, longer than the cup; the fruit is a kidney-shaped oblong gibbous, compressed, drupe: the seed is an oblong compressed woolly nut.

MANGOSTANS, or **MAGOUSTANS**, the fruit of the garcinia. See **GARCINIA**.

MANHEIM, a city of Germany, in the palatinate of the Rhine, situated at the con-

confluence of the Rhine and Neckar : east long. $7^{\circ} 20'$, north lat. $49^{\circ} 30'$.

MANIA, MADNESS, in medicine. See the article MADNESS.

MANICHEES, in church-history, a sect of christian heretics in the third century, the followers of Manes, who made his appearance in the reign of the emperor Probus; pretending to be the comforter, whom our Saviour promised to send into the world. He taught that there are two principles, or gods, coeternal and independent on each other, the one the author of all evil, and the other, of all good; a doctrine which he borrowed from the persian magi. He held that our souls were made by the good principle, and our bodies by the evil one, and that the souls of his followers passed through the elements to the moon, and from thence to the sun, where being purified, they then went to God, and became united with his essence; but as for the souls of other men, they either went to hell, or were united to other bodies. He alledged, that Christ had his residence in the sun, the Holy Ghost in the air, wisdom in the moon, and the father in the abyss of light. He is also charged with denying the resurrection and condemning marriage; with teaching that Christ was the serpent that tempted Eve; with forbidding the use of eggs, cheese, milk and wine, as proceeding from the bad principle; with using a different kind of baptism from that of the church; with teaching that magistrates were not to be obeyed, and with condemning the most lawful wars.

MANICORDON, or **MANICHORD**, a musical instrument in the form of a spinet; the strings of which, like those of the clarichord, are covered with little pieces of cloth, to deaden, as well as to soften, their sound; whence it is also called the dumb spinet. It is much used in nunneries, because the nuns may play upon it without disturbing that silence which they are obliged to observe in their cells.

MANIFESTO, a public declaration made by a prince in writing, shewing his intentions to begin a war, or other enterprise, with the motives that induce him to it, and the reasons on which he founds his rights and pretensions.

MANIHOT, or **MANIOC**, in botany, a plant otherwise called jatropha. See the article JATROPHA.

MANILLE, in commerce, a large brass-

ring in the form of a bracelet, either plain or engraven, flat or round.

Manilles are the principal commodities which the europeans carry to the coast of Africa, and exchange with the natives for slaves. These people wear them as ornaments on the small of the leg, and on the thick part of the arm above the elbow. The great men wear manilles of gold and silver, but these are made in the country by the natives themselves.

MANINGTREE, a market-town of Essex, twenty-five miles north-east of Chelmsford.

MANIPULUS, in roman antiquity, a body of infantry, consisting of two hundred men, and constituting the third part of a cohort. See the article COHORT.

Among physicians, the term manipulus signifies a handful of herbs or leaves, or so much as a man can grasp in his hand at once; which quantity is frequently denoted by the abbreviature, M, or m.

MANIS, the **SCALY LIZARD**, in zoology, a genus of quadrupeds, of the order of the agriæ; the body of which is covered with a kind of scales, and it has no ears: there is but one known species of this genus, which has been confounded with the lizards: this is an animal of great beauty, and perhaps one of the most singular in the world; its aspect has a great shew of terror, but it is the most inoffensive creature imaginable: its form is somewhat like the lizard: it is about four feet in length, and its body, in the broadest part, which is towards the hinder legs, is about ten inches in breadth; it is of a rounded figure on the back; the legs are short, and stand about a foot distance; the rest of the creature, from the hinder part to the extremity, is a tail, broad, thin, and between two and three feet in length; it is not connected to the hinder-part of the body, but is continuous with it: the whole upper surface of this creature, the back, and the outsides of the legs are covered with an armature of scales; the belly and insides of the legs are naked; the scales are of a firm substance, and have very much the appearance of tortoise-shell; they are on the body two inches in length, and more than an inch in breadth, of an oval figure, and each terminating in a kind of spine; the head is small, of a conic figure, about three inches in diameter at the base, and thence gradually growing smaller to the snout, which is sharp and naked;

naked; the head is covered with the same sort of scales with that of the body, only they are smaller; there are no teeth in the mouth, but the tongue is ten inches or more in length; the whole creature is of a brown colour; the striated parts of the scales is of a red, dusky brown; the smooth, polished part has an admixture of yellow; the sides of the body, and those of the tail, are of a serrated form, the scales terminating one over another at some distance; the legs are robust, and the claws very strong and thick; it is a native of the east Indies and South America, lives in the woods, and feeds on insects, as the ant-bear does, thrusting out its tongue till covered with them, and then drawing it in loaded with the food.

MANNA, in the materia medica, the concreted juice of some vegetable, naturally exsuding from it, soluble in water, and not inflammable.

It is a honey-like juice, brought to us from Calabria and Sicily, sometimes in small granules, or drops of an irregular figure, roundish, oblong, crooked, and sometimes contorted. It should be chosen whitish, or at the utmost, with only a faint cast of yellow, not too heavy, in regular dry granules, or in moderately long striæ or flakes, of a pleasant taste, and dissolving wholly in the mouth, not leaving a farinacious substance behind it, as much of the common manna does, that has been adulterated with honey and flour.

Manna is the mildest and safest of all purges, and may be given to children, to women with child, and to people of the most tender constitutions, with perfect safety; and it never fails gently to move the bowels, and to carry off the thick viscid foulnesses from them. Its dose is from two drams to an ounce or more, and is most conveniently given in solution. When required to work more violently than it naturally would, it may be quickened with an addition of Glauber's salt.

Manna is obtained from several sorts of trees, especially ash; and the finest kind is that which oozes naturally out of the leaves. Besides which there is another coarser kind obtained by wounding the bark of the trunk and branches of these trees.

In the french shops there is also met with a manna, produced from the larch-tree; and our black-thorn, or sloe-tree, some-

times yields a true manna from the ribs of the leaves. The manna perficum, or persian manna, is obtained from a shrub called alhagi. See the article **ALHAGI**. As to the manna mentioned in scripture, it could not be true manna, because it melted with the heat of the sun; which true manna does not, but rather hardens by it.

The antient Greeks likewise called the small fragments of frankincense, by the name manna.

MANNER, in painting, a habitude that a man acquires in the three principal parts of painting, the management of colours, lights and shadows, which is either good or bad, according as the painter has practised more or less after the truth, with judgment and study. But the best painter is he, who has no manner at all. The good or bad choice he makes is called goûté.

MANNERS, in poetry, the inclinations, genius and humour, which the poet gives to his persons, and whereby he distinguishes his characters. See the article **CHARACTER**.

MANNING, in the navy, denotes the providing a ship or fleet with a sufficient number of men for an expedition.

In manning the navy, it is usual to promise by proclamation, a bounty to all seamen, and able-bodied landmen, who come into the service by a certain time, which is frequently two months pay, and seldom more. This does indeed prevail on many, yet great numbers conceal themselves until the fleet is at sea, and others lurk about even till the time limited for such bounty is near expired, which does not a little prevent fleets oftentimes from being in a readiness for an early expedition.

And as seamen are thus encouraged to enter themselves voluntarily, so there is another method used to compel them to it, and that is, pressing them by warrants from the lord high admiral to the captains, and by them assigned to their lieutenants; and to render this the more effectual, vessels are purposely hired into the service to proceed from place to place with those officers, and their press-gangs, not only to receive volunteers, but to impress what men they can light on. Notwithstanding this, their success is very uncertain, and always expensive: therefore, it is much to be wished, in a matter of so great a consequence to the nation, that more speedy and effectual methods

methods could be taken for manning the fleet.

MANOMETER, or **MANOSCOPE**, an instrument to shew or measure the alterations in the rarity or density of the air. The manometer differs from the barometer in this, that the latter only serves to measure the weight of the atmosphere, or of the column of air over it; but the former the density of the air in which it is found, which density depends not only on the weight of the atmosphere, but also on the action of heat and cold, &c. Authors, however, generally confound the two together, and Mr. Boyle himself gives us a very good manometer of his contrivance, under the title of a statical barometer. See **BAROMETER**.

MANOR, an antient royalty or lordship, formerly called a barony, consisting of demesnes, services, and a court-baron; and comprehending in it messuages, lands, meadow, pasture, wood, rents, an advowson, &c. It may contain one or more villages, or hamlets, or only a great part of a village, &c.

A manor is a noble kind of fee, granted in part to tenants for certain services to be performed, and partly reserved to the use of the lord's family, with jurisdiction over the tenants, for their farms or estates.

There are capital manors or honours, that have other manors under them: and also customary manors granted by copy of court-roll, the lords of which have power to hold courts, and grant copies, &c.

MANS, the capital of the territory of Maine, in the province of Orleanois, in France: east long. 5', north lat. 48° 6'.

MANSE, in law, is a farm-house, with land belonging to it.

MANSFIELD, a city of Germany, the capital of a county of the same name, in the circle of Upper Saxony: east long. 11° 45', north lat. 51° 36'.

MANSFIELD is also a market-town of Nottinghamshire, twelve miles north of Nottingham.

MANSION, in law, is the chief dwelling-house of a lord within his fee, or the capital messuage, or manor-house.

Mansion also, in a more general sense, signifies any dwelling-house, and even a chamber in one of the inns of court comes under the denomination of a mansion; but this is not the case, with respect to any other chamber in which a person lodges.

MANSLAUGHTER, generally termed homicide, is killing a person without permeditated malice.

Manslaughter differs from murder, in its not being committed from the dictates of a former malicious intention; and from chance-medley, in its being done with a present intention to kill. Thus, where two persons, who before meant no harm to each other, meet and quarrel, and in the heat of passion one kills the other; in this case he is guilty of manslaughter. If two persons fall out and fight, and the one breaks the other's sword, on which a stander by lends him another, with which the adversary is killed, it is manslaughter both in the slayer and stander-by. And where a man is taken in adultery with another person's wife, and the husband immediately draws and kills him, it is only manslaughter, the husband having had a just provocation for so doing: but where any other person stabs another, who has not a weapon drawn, or struck first, so that the person stabbed dies within six months, notwithstanding there was not malice aforethought, it is felony without benefit of clergy. In other cases, though manslaughter is accounted felony, yet for the first offence the offender is allowed the benefit of clergy.

MANTELETS, in the art of war, a kind of moveable parapets, made of planks about three inches thick, nailed one over another, to the height of almost six feet, generally cased with tin, and set upon little wheels, so that in a siege, they may be driven before the pioneers, and serve as blinds to shelter them from the enemy's small shot. See plate CLXX. fig. 3.

There are other sorts of mantelets covered on the top, whereof the miners make use to approach the walls of a town or castle.

MANTIS, the **PRAYING LOCUST**, in zoology, a species of gryllus, so called from the posture wherein it usually holds its anterior pair of legs.

MANTLE, or **MANTLE-TREE**, in architecture, the lower part of the chimney, or that piece of timber which is laid across the jaumbs and sustains the compartment of the chimney-piece. See the article **CHIMNEY**.

MANTLE, or **MANTLING**, in heraldry, that appearance of folding of cloth, flourishing or drapery, that is in any atchievement drawn about the coat of arms.

arms. It is supposed originally to be the representation of a mantle, or military habit, worn by the antient cavaliers over their armour to preserve it from rust; or, as others hold, a short covering only worn over the helmet, which in after-times was lengthened, and made to hang from the helmet below the whole shield, as in plate CLXV. fig. 3.

The mantle is always said in blazon, to be doubled, that is, lined throughout with one of the furs, as ermin, pean, viary, &c. See the article COAT.

MANTUA, the capital of a dutchy of the same name, in Italy, is situated in the middle of a lake, formed by the river Mincio, but has a communication with the continent by three causeways: east long. $11^{\circ} 15'$, north lat. $45^{\circ} 20'$.

MANUCAPTIO, in law, a writ which lies for a man who being taken on suspicion of felony, and offering sufficient bail for his appearance, is refused to be admitted thereto by the sheriff, or other person having power to let to mainprize.

MANUCODIATA, in ornithology, the bird of Paradise. See PARADISE.

MANUMISSION, in roman antiquity, the act of setting a slave at liberty, which was usually performed before the prætor, who laid his wand, called vindicta, on the slave's head, and declared him free.

MANUFACTURER, one who works up a natural product into an artificial commodity.

Persons employed in making up the woollen, linen, fustian, cotton, or iron manufactures, and all journeymen dyers, hot-pressers, shoe-makers, glovers, those employed in making of hats, or in any manufactures of silk, mohair, fur, hemp, flax, leather, or of any mixed materials, who shall lessen the value, embezzle or purloin any materials with which they are intrusted, on being convicted by the oath of one witness, or confession before a justice of peace, are to forfeit double the value of the damages sustained, with costs: and in case immediate payment be neglected, the justice is to commit the offender to the house of correction to be whipped, and to suffer hard labour for a term not exceeding fourteen days. and on further conviction for embezzling any of the materials, whether they be, or be not made up, the persons are to forfeit four times their value, with costs. And if payment with costs be neglected, they are to be committed to the house of correction, to hard labour, for a time

not exceeding three months, nor less than one, and to be whipped in the market-town, at the market-place, or cross, once or oftener. And if any person buy, or take by way of gift, pawn, or sale, any materials, knowing the same to be embezzled, he is to suffer the same forfeiture, as the person purloining them; all which forfeitures, are by 13 Geo. II. to be applied, one half to the party injured, and the other to the poor of the parish. But any one aggrieved, may appeal to the general or quarter-sessions. If any person intrusted with materials to manufacture, shall not use them, and shall delay, for twenty days after such materials shall be manufactured, to return (if required by the owner) so much as shall not be used, such neglect will be deemed an embezzling. And if any person who shall work up any of the manufactures for one master, shall neglect to finish them by procuring himself to be retained by another, before the work shall be completed, he shall be sent to hard labour, not exceeding one month.

MANURE, any thing used for fattening and improving land.

There are various kinds of manure used in different parts of England, for enriching the several soils, some of which have been already mentioned under the articles dung, chalk, lime, &c. which see: but there are others that might be used on many lands with equal success.

All sorts of marl and clay, spread over gravelly and sandy land, are of vast advantage to it, by making it more solid and tenacious, as all kinds of sand are to those soils that consist of a stiff loam or clay. These kinds of manure are of lasting advantage. See the article SAND. Tanner's bark, laid in a heap, and rotted, is also an excellent manure, especially for stiff cold land, and one load of it will improve the ground more, and last longer than two loads of the richest dung: when this manure is laid on grass, it should be done soon after Michaelmas, that the winter rains may wash it into the earth: and where it is used for corn-land, it should be spread on the surface before the last plowing, that it may be turned down for the fibres of the corn to reach it in the spring. Rotten vegetables of most sorts, also greatly enrich land, so that where other manure is scarce, these may be used with great success: thus the weeds of ponds, lakes, and

and ditches, being dragged out just as they began to flower, and laid on heaps to rot, will make excellent manure: but it is to be observed, that in rotting these vegetables, it will be proper to mix some earth, mud, or any other such like substance with them, to prevent their taking fire in their fermentation; it will also be proper to cover the heaps with earth, mud, or dung, to detain the salts; otherwise many of the finer parts will evaporate in fermenting. The refuse of kitchen-gardens, when laid on heaps and rotted, will also afford good manure for corn-land: and also fern mowed down while it is green and tender, and laid on heaps to rot, will make excellent manure; and by frequently mowing it, this troublesome plant will be destroyed. The ashes of all kinds of vegetables are also good manure for land, so that where the ground is over-run with bushes, brambles, &c. if they are grubbed up in summer, spread abroad to dry, and then consumed to ashes, and spread over the land, they will greatly improve it. Rotten wood, and saw-dust, when rotted, are a very good manure for strong land, as are also bones, horns, shells, woollen rags, &c. and whatever serves to loosen its parts.

MANUSCRIPT, in matters of literature, denotes a written book, in contradistinction to a printed one. See **BOOK**.

MANWORTH, in law, the price antiently set upon a man's life, which was paid to the lord for killing his villain.

MAP, a plain figure, representing the surface of the earth, or a part thereof, according to the laws of perspective. See the article **PERSPECTIVE**.

In maps, these three things are essentially requisite. 1. That all places have the same situation and distance from the great circles therein, as on the globe, to shew their parallels, longitudes, zones, climates, and other celestial appearances, 2. That their magnitudes be proportionable to their real magnitudes on the globe. 3. That all places have the same situation, bearing and distance, as on the earth itself.

The true chart performs the first and last of these very exactly, but fails extravagantly in the second; and, indeed, no kind of projection yet found can exhibit more than two of them at once, by reason of the great difference between a plane and convex superficies.

Maps are not always to be used as they

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lie before us, for sometimes any part is uppermost; but, generally, the top is the north part, the bottom the south, the right hand the east, and the left hand the west, and marked with these words, or latin ones of the same import. There is also inscribed a compass, pointing to all the quarters of the world, the north one being marked with a flower de luce.

The degrees of longitude are always numbered at top and bottom, and the degrees of latitude on the east and west sides. In all right-lined, and general circular maps, except those of Wright's Projection, the degrees of latitude on the sides are of an equal breadth; and in all circular and right-lined maps, except the said Wright's, and the plain charts, the degrees of longitude are unequal.

In general maps, the circles corresponding to those in the heavens are inscribed, viz. the equator is expressed by a straight east and west line; and the first meridian, the polar circles, the tropics, and the other meridians and parallels, which are drawn at every five or ten degrees, intersect each other at right angles.

In several maps there are three sorts of scales of miles, according to the various computations in different parts of the same country, viz. greater, lesser and mean; besides which, there are often affixed scales of other country-measures, as Dutch, French, Italian, &c.

As for other matters, regarding maps in general, the characters used to denote cities, rivers, roads, boundaries, and the like, they are usually explained in the maps themselves. We shall therefore proceed to shew the several methods of constructing the geographical maps in order: and first of the

Stereographic projection of MAPS upon the plane of the equator, the eye being supposed placed in one of the poles. To do this proceed thus: from P, the pole, (plate CLXVII. fig. 1. n^o 1.) draw a circle A B C D, of what circumference you please, to represent the equator, which cross with two diameters A C, B D, dividing it into four quadrants, then subdivide each of these into nine, and these again into ten more, if the largeness will admit; and from D, the point of intersection of the first meridian B D, number every tenth degree with figures, both on the right hand and on the left, till they meet in the opposite point B 180; so will the map be divided into east and west longitude. Then from the pole draw

right lines to every such tenth degree in the equator, as is done in the quadrant DC; and these will represent the meridians, and the figures will shew the longitude.

To delineate the parallels of latitude, from B draw lines to every tenth degree in the quadrant AD; and where they intersect the diameter PA, through those points must circles be described from the center P, and then numbered from the equator towards the pole with 10, 20, 30, &c. Thus you have the meridians and parallels projected; and since the polar circles and tropics are only parallels, at a certain distance from the pole and equator, viz. $23^{\circ} 30'$; therefore set off $23^{\circ} 30'$, on the equator from D to E, as also from C to F; then through the points H and I, where the lines BE and BF intersect AC, describe double circles to distinguish them from other parallels. So shall PH represent the arctic circle, and PI the tropic of cancer. The lineaments of your map being thus projected, places may be inserted by help of a table of latitudes and longitudes, as represented *ibid.* n^o 2. But in these maps, the mutual bearings and distances of places cannot be determined; also countries near the equator take up more room than proportionably they should.

Orthographic projection of MAPS upon the plane of the equator, wherein the eye is supposed to be at an infinite distance in the axis, two hundred semi-diameters at least; by which means the places about the pole, which may be discerned at any distance, will have a larger projection than those nearer the equator; just the reverse of what happened in the former projection.

In this projection, the equator must be drawn and divided, and meridians delineated in the same manner as taught above; then to describe the parallels proceed thus: from either side of the first meridian AP (plate CLXVII. fig. 2, n^o 1.) draw right lines through the corresponding degrees, or every tenth degree of the quadrants AB, AD, parallel to the diameter BD; and through the points where these cut the meridian AP, draw circles representing the parallels, numbering them with 10, 20, 30, &c. from A to the pole P, to shew the degrees of latitude. To delineate the polar circles and tropics, set off from B to G, and from D to H $23^{\circ} 30'$; as also from A to I, and

from A to K; and drawing lines between each, through the points of intersection of the first meridian AP, draw circles: thus PL will represent the polar circles, and PM the tropic of cancer. The ecliptic may be projected, and places laid down in the same manner as above; *ibid.* n^o 2. This kind of the equatorial projection, shews the true decrease of the degrees of the equinoctial, or of longitude, in every parallel of latitude: the circumpolar regions may be delineated better in this than in the former projection; and so may Tartary, and the north parts of Europe, as Sweden, Norway and Muscovy.

But besides the inconveniencies, already mentioned, attending these two kinds of projection, there is no bringing all the places in the eastern or western hemisphere into less than two hemispheres, so as to express Europe, Asia and Africa, or America by itself, in one map. Geographers have therefore invented another way, somewhat more difficult indeed, but much more natural and useful, viz.

Stereographic projection of MAPS, upon the plane of the first meridian, wherein you must conceive the eye to be situated in that point of the equator, which is cut by the meridian 90° distant from the first meridian. In this projection the equator is a right line, as is also the meridian 90° distant from the prime one, and cutting it in the point of the eye's position: but the other meridians, and all the parallels, are arches of circles, and the ecliptic an ellipsis.

The method is this: describe the circle NESW, (plate CLXVII. fig. 3.) representing the first meridian; cross it with two diameters at right angles, and WCE shall represent the equator, W the west part, and E the east; and the other diameter NGS will be the meridian, 90° distant from the first, N representing the north and S the south pole, and C the point where the eye is supposed to be.

To delineate the meridians, proceed thus: from N draw lines through each tenth degree, or each degree, if you think fit, of the quadrants WS or SE, which shall cut the quadrant of the equator WC in F, G, H, I, K, L, O, P; or, to avoid scores in your paper, make a point in the line where the side of the ruler cuts it. You need only divide one quadrant, because the divisions in it may be transferred into the lines CN, CE and CS, which will save the trouble of their particular divisions. Thus are the points in the equator, through

through which the meridians are to pass; as, also, those points in the perpendicular meridian, determining the ambit of the parallels, found out. The centers of all those meridians, whose distance from the first meridian, NWSE, does not exceed 45° , may be found out in the line CE, reckoning every second degree from the point C, for the centers of each degree from the point W. By the same proportion, we must take every twentieth degree, or point, from C, in the line CE, for centers to each tenth degree or point, from W, in the line WC: therefore Q will be the center of F, R of G, T of H, and V of I. But because the centers of the meridians, exceeding 45° , lie without the circumference of the first meridian, in the line CE extended; therefore, laying the ruler upon N, and every second degree, or, according to the projection upon every twentieth degree of the quadrant NE, make points in the extended line CE, which shall be the centers of all the other meridians where the edge of the ruler cuts it. Thus X will be the center of K, the meridian 50° distant from the primitive, and so on. And, in the like manner, may the meridians be described through the points in the line CE, by transferring the center-points of CE to CW continued.

The points for the projection of the parallels being already marked in the lines CN and CS, to find the centers of these points, erect a perpendicular at E, as *ab*; and from C, through each tenth degree of the quadrant NE, draw secant lines to cut the said perpendicular in *c, d, e, f, &c.* Then take the distance Cc in your compasses, and transfer it upon the line CN, continued, from C to 1, which will be the center to the parallel *b80b*; Cd transferred to C2 will give the center of the parallel *i70i*; C3 = Ce will be the center of *k60k*; and so on for the rest of the parallels.

To project the tropics and polar circles, set off, on each side the equator and poles, $23^{\circ} 30'$; then draw a secant from C, through these points, and transfer the point of intersection with the tangent line, as before, for the centers of those circles. The construction of the parallels of the other hemisphere is performed in the same manner, viz. by transferring the centers found by the intersection of the secants with the tangents, to the line CS, continued.

There are two ways of projecting the

ecliptic: for supposing C to be the first point of aries, and the eye to be in the vertical colure, it will be represented by a right line, drawn from the beginning of cancer B, through the beginning of aries C, to the beginning of capricorn M; which being graduated like the equator, the degrees of each sign are to be marked upon it. To do this, cross the ecliptic BM with a line at right angles, drawn from the opposite points of the polar circles in the meridian, Z, D; divide the quadrant BD into nine equal parts, each containing 10° ; and laying a ruler upon Z, and upon each division of the quadrant BD, cut the line BM as you did the equator. But all this trouble may be spared, by transferring the divisions of the equator upon the ecliptic BM.

The other way of projecting the ecliptic, where the eye is supposed to be in the solstitial colure, is the same as in all maps of the hemispheres, where it cuts the points of the intersection of the first meridian and equator, at W and E; and the third point is that wherein the tropic BAY cuts the meridian NCS at A.

The construction is now ready for inserting the places in the maps, which may be done by the help of a table of longitudes and latitudes, as in the former methods.

The advantages of this projection are these: 1. It very agreeably represents the hemisphere intercepted between the two poles, with all the parts entire. 2. It shews the longitudes, latitudes and distances of places from all the great circles, exactly as on the globe itself.

Its defects are also two. 1. That the degrees of the equator, meridians and parallels, are unequal, except those of the first meridian, encreasing gradually the nearer they approach to the first or prime meridian; and consequently the parts about C are less, and those about A, and C greater than they ought: and, in the same manner, the places about the poles bear an unequal proportion to those nearer the equator. 2. The course and distance between places, are neither with ease or exactness found in this projection. If you would project a map of any particular portion of the earth, less than an hemisphere, you must make the projection proportionable to the extent of the map you intend to draw, and then cut out so much of it as is terminated by the greatest degree of longitude and latitude of the country to be projected. For example,

ample; suppose you would draw a map of Europe, according to this construction, which being laid down as directed above, through the points where the parallels of the greater and lesser latitude of Europe, *viz.* 72° and 34° , cut NC , draw lines parallel to the equator: and because, in the common maps, Europe includes 93° of longitude, therefore set off, *viz.* $46^{\circ} 30'$ from n to g and from n to p , and draw $gp = 93^{\circ}$, the extent of Europe in longitude; then erect perpendiculars on the points g and p , to square your map; or, to save this trouble, set off ng from q to r , and from q to t , and cut out your map accordingly. However, it is best to allow a little more room in separating your map from the rest of the projection to express the situation thereof in respect of other countries.

Orthographic projection of MAPS on the plane of the meridian, in which the parallels of latitude are all right lines, and all the meridians, except the first, semi-ellipses; which construction is formed by supposing perpendiculars to fall from all points of each hemisphere on the plane of the first meridian.

Thus let $NESW$, (pl. CLXVIII. fig. 1.) the meridian, be divided, as in the former method, into four quadrants, and each quadrant into 9 or 90 equal parts or degrees; from each tenth degree of the quadrants NW and WS , draw lines to each corresponding tenth degree in the quadrants NE and ES , parallel to the equator WE , and these will be the parallels of latitude: and having numbered each parallel on the first meridian, and in GN and CS , transfer the intersections of these parallels with CN or CS into CW and CE , which will give the points in the equator through which the meridians must pass; and number these from W towards E , for degrees of longitude.

Then, since the meridians are semi-ellipses, you may describe them through the given points, *viz.* the two poles and the divisions of the equator WE , with elliptical compasses; or, by help of a sector, you may find the points in each parallel of latitude, through which the ellipses may be formed. The ecliptic, in this projection, will be represented by an elliptical or straight line, in the same manner as in the former method.

The maps of this construction have this advantage above the preceding methods, that they exhibit the true proportional decrease of the degrees of the equator in each parallel; but this advantage is

counter-balanced by a great inconvenience, *viz.* the too great contraction of the meridians the nearer they lie to the first, which makes this projection unfit for general maps; Africa being the only quarter of the globe that would nearly retain its due figure and dimensions.

Stereographic projection of MAPS, upon the plane of the horizon, the eye being supposed in the zenith for the upper hemisphere, and in the nadir for the lower one. The common method of construction is this: suppose it were required to describe an horizontal projection for the city of London, in latitude $51^{\circ} 32'$; from L or Z , (plate CLXVIII. fig. 2.) the zenith and London being here the same, describe the circle $NESW$ of what extent you please; to represent the horizon, quarter it, and divide each quarter into 90° ; or, to avoid confusion, divide only one quadrant NW or WS ; draw the diameter NS , which let be the first meridian, then will WE be the prime vertical, or azimuth of east and west. Next take $51^{\circ} 32'$ from the divided quadrant NW , and set it off from N to A ; then draw a line from W to A , and where the ruler cuts NS make a point, which shall represent the arctic pole P . Thirdly, take the distance of the arch of any of the quadrants, as NE , and set it off from A to B ; and where the line WB cuts the diameter NS , that point Q will be the point of the intersection of the meridian with the equator. Fourthly, divide the semicircle $NAEBS$, from B , into degrees, the same in proportion to those of the quadrant NW ; and from W to each, or each tenth degree, lay a ruler, and mark where it cuts the line NS , for there will be the points of the intersection of the parallels with the first meridian, which fall within the periphery of the projection. But if you would find the opposite point of each parallel, in order to delineate them easily on the projection, continue the division of the periphery from the equatorial point B , upon the quadrant NW , and draw lines as before through each point to cut the diameter NS continued; then describe circles through the points of equal degrees from the pole P , through 80 , 70 , 60 , &c. in the line PS , and 80 , 70 , 60 , &c. in the line PN , extended. Thus may all the parallels, tropics, and polar circles be projected.

In the construction of the meridians proceed thus: first, through the points W , P , E , draw a circle, the half of which is CPD , and delineate thereon the meridian pro-

projection, by dividing it into 360° ; then drawing lines from P to every degree, or tenth degree; and, lastly, describing circles from the centers found in the line CD, continued at both ends, through the division in the diameter WE, and the poles, in the same manner as directed in the stereographic projection upon the meridian, the parallels excepted, which must not be drawn. In describing the meridians, observe to draw each through the pole to touch the horizon, which will be the meridians north of the pole. Thus, when you describe the meridian FP, describe at the same time FPG; and the same holds of all the rest.

When you have proceeded thus far, describe a circle round the horizon pretty close, to contain the degrees of graduation, which must be made between the meridians, and not the parallels, each into ten parts or degrees, to shew the longitudes of places. The latitude must be graduated on the first meridian NS, and numbered from the equator towards either pole, and from the pole backward, towards N. This done, draw a circle with this again, wide enough to hold the figures belonging to the numbered degrees. Lastly, describe two more circles, the first near the former, and divide the quadrants into eight equal parts each, or thirty-two in all, to represent the points of the compass, and shew the bearings of places in respect of London the center. The outward graduated circles supply the place of azimuths, to draw which would occasion confusion in the scheme; for if a central rule be fixed upon a pivot in the center, or place representing London, and graduated with the same divisions as ZN, by moving it about to any place, we may easily discover not only the bearing but the distance of that place from London.

All these circles are expressed in the lower figure, in which so much of the earth is described as is contained within the horizon of London, as a specimen of the nature and use of this projection. Thus your projection being completed, it is easy to insert the places, according to their latitudes and longitudes.

Horizontal projection of MAPS, with azimuth lines. Those who are unwilling to take the trouble of laying down the former projection, and are content to know the bearings and distances of places from the center, without the longitude or latitude, may divide the circle NESW

(plate CLXVIII. fig. 3.) into degrees and points of the compass; where NS represents the meridian, WE the east and west line, and Z the zenith, or place in the center. This done, you may put London, or any other place in the center; and by the help of the scale of equal parts ZA, fixed in the center, the bearings and distances of places may be laid down from the globe or maps.

Mercator's or Wright's projection of MAPS.

The principles upon which this admirable contrivance is founded, have been already explained under the article CHART. Now to apply this method to the projection of maps, draw the line AB, (plate CLXIX. fig. 1.) and divide it into as many degrees as your map is to contain in longitude, suppose 90° . At the extremities A and B raise perpendiculars, to which draw parallel lines at every single, fifth, or tenth degree of the equator for the meridians; as in the figure where they are drawn at every tenth degree. This done, put one foot of the compasses in the point A, and extending the other to the point in the first meridian in the equator G; or, for greater exactness, to some more distant point, as B 90° . Describe the quadrant FB, which divide into nine equal parts, and draw lines from A to each point of the division; or, to avoid scoring the paper, only mark where a ruler cuts the first meridian GH, at every tenth degree's distance. Lastly, because the distances of the parallels from one another are marked, by this means, in the line GH, you must transfer them from that line to the side lines AC, BD, after the following manner. 1. Set one foot of the compasses in A, and extending the other to the first point above G, marked 1, transfer this distance, viz. A 1, to the lines AC, BD, and draw a line parallel to the equator AB, for the tenth parallel. 2. Next transfer the distance A 2 into the lines AC, BD, from the tenth parallel to the twentieth, which is to be drawn. 3. In the same manner, the distances A 3, A 4, A 5, &c. laid off upon the lines AC, BD, from the immediately preceding parallels, viz. 20, 30, 40, &c. will successively point out where the parallels, 30, 40, 50, &c. are to be drawn.

This is the geometrical projection, which may also be laid down by means of a scale or table of meridional parts, by the line of secants, &c.

Though this projection be most true, yet hath

hath it this disadvantage, of extorting the figure, magnitude and proportion of countries; we shall therefore add a more exact method of projecting particular maps, wherein the squares are so projected as to form equal diagonals throughout.

A new, easy, and exact method of projecting particular MAPS. Suppose you would draw a map of some part of the earth, containing 6° of latitude, viz. from 39° to 45° , let the longitude be what it will.

1. Draw the line EF, (plate CLXIX. fig. 2.) and in its middle raise the perpendicular DC, which divide into six equal parts, or degrees of latitude; and through C, draw a line parallel to EF.
2. Divide a degree into ten, or if large enough to admit it, into sixty equal parts; and in the table for decreasing longitude, find the content of a degree of longitude in the latitude of 39° , viz. 46.62 miles.
3. From the degree so divided, take the parts 46.62; divide that distance, and from D set off one half to E, and the other half to F.
4. Find the content of a degree in latitude 45° , viz. 42.43 miles; take that distance from the scale of the degree; divide it; and from the point C lay one half to I, and the other half to K.
5. Draw straight lines from I to E and from K to F; divide them in like parts with CD, and through those marks draw parallel lines.

Thus IKFE is a projection for one degree of longitude, including six degrees of latitude; which may be transferred upon the paper, as often as there is occasion, by the following method.

1. If the compasses be large enough, or the projection will admit it, take the distance from E to K, or from F to I, and setting one foot first in E and then in F, describe the arches L and M. In like manner set one foot first in I and then in K, and with the same extent draw the arches N and O: take the distance with another pair of compasses, between E and F, and set it off from E to N, and from F to O: likewise set the distance between I and K, from I to L, and from K to M; draw lines between L and N, and M and O; divide them into degrees, and draw parallels from those points to the corresponding points in the meridians IE and KF. And, after the same manner, may meridians and parallels be drawn, to as many degrees of longitude as your map contains.

2. If the map be very large, so that the compasses cannot extend to the farthest

degree, or from F to I, then you may draw one or more diagonals, as you can conveniently, at once; and then proceed to draw the rest. Thus, when you have laid down the squares PGEN (*ibid.*) and HQOF, in the same manner as directed above, go on to draw LIGP and KMQH, by the same method.

In this projection, the diagonals being all equal, places lying in the remotest longitudes or diagonals, are as truly exhibited as those near the middle, and consequently their distances conformable to one common measure; so that the compasses, extended between any two places, and applied to the scale, give the distance without more ado. The bearings too will be very conspicuous by means of a compass drawn on a corner or side of the map.

The scale on the sides, is that by which the distances are measured; but it must be graduated on one of the meridians, and not on the out lines of the map, as is commonly done.

Printed maps, on being imported from abroad, pay a duty of 15 s. $4\frac{80}{100}$ d. per

ream; and draw back, on exportation, 13 s. 6 d. and, if in frames, for each

map 1 s. $2\frac{36\frac{1}{4}}{100}$ d. the drawback being 1 s. $9\frac{3}{4}$ d. $\frac{100}{100}$

MAPLE, *acer*, in botany, a genus of the octandria monogynia, class of plants, the flower of which is composed of five oval petals; the fruit consists of a number of capsules, which grow together at the base; and are compressed, roundish, and each terminated by a very large membranaceous ala; the seeds are single and roundish.

MAPPARIUS, in roman antiquity, the officer, who gave the signal to the gladiators, to begin fighting; which he did by throwing an handkerchief, that he had received from the emperor or other magistrate.

MARACAIBO, a city and port-town in the territory of Venezuela, situated on the west side of the lake of Maracaibo, in Terra Firma, in South America: west long. 70° , and north lat. $10^{\circ} 45'$.

MARANA, or **MARAGNA**, a city of the province of Romania, in european Turkey: east long. 26° , and north lat. $40^{\circ} 36'$.

MARANO, a town of the province of Friuli, in the territory of Venice, thirty miles north-east of that capital.

MARANTA, in botany, a genus of the monandria

monandria monogynia class of plants, with a monopetalous ringent flower, the tube of which is oblong, compressed, crooked, and oblique, and its limb sexifid; the fruit is a roundish capsule, somewhat obscurely trigonal, containing a single, hard, and rugose seed.

MARASMUS, among physicians, denotes an atrophy or consumption, in its last and most deplorable stage. See the article CONSUMPTION.

MARAVEDI, a little spanish copper-coin. See the article COIN.

MARBLE, *marmor*, in natural history, a genus of fossils; being bright and beautiful stones, composed of small separate concretions, moderately hard, not giving fire with steel, fermenting with and soluble in acid menstrua, and calcining in a slight fire.

The colours of marbles being a very obvious and striking character, they are arranged according to them, in the following divisions. 1. Of the white plain marbles there are two sorts; the parian marble of the antients, and statuary marble of the moderns, an extremely bright and elegant marble; and the carrara marble, a very fine marble, more compact and close than the former, but less bright. 2. Of the plain yellowish marbles there is only one sort, which is a hard, pale yellow, and glossy marble, found in many parts of Italy. 3. Of the bluish and black marbles there are a great many species, as the chian marble, basaltis, &c. 4. Of the plain green marbles there is only one kind, the lacedemonian marble of the antients. 5. The pale coloured or whitish brown, commonly called darby-marble. 6. The green marbles with shells. 7. The black coralloide marble, with and without shells. 8. Of the white variegated marbles there are a great many species, variegated with purple, brown, red, blue, &c. 9. Of the brown variegated marbles there are likewise several sorts, some with red veins, others with white, black, or brown veins. 10. Of the yellow veined and variegated marbles, some are veined with purple, and others with blue. 11. Of the black variegated marbles, some are veined with white, and others with blue, yellow, red, &c. 12. The green variegated marbles are likewise distinguished by the colour of their veins. 13. The grey spotted marbles are variegated, some with black, and others with green spots. 14. The red variegated marble is the brocatello of

the Italians, with white and gold veins. **Colouring of MARBLE.** The colouring of marbles is a nice art, and in order to succeed in it, the pieces of marble, on which the experiments are tried, must be well polished, and clear from the least spot or vein. The harder the marble is, the better it will bear the heat necessary in the operation; therefore alabaster, and the common soft, white marble, are very improper to perform these operations upon.

Heat is always necessary for the opening the pores of the marble, so as to render it fit to receive the colours; but it must never be made red hot, for then the texture of the marble itself is injured, and the colours are burnt, and lose their beauty. Too small a degree of heat is as bad as too great; for, in this case, though the marble receive the colour, it will not be fixed in it, nor strike deep enough. Some colours will strike, even cold, but they are never so well sunk in as when a just degree of heat is used. The proper degree is that which, without making the marble red, will make the liquor boil upon its surface. The menstrua used to strike in the colours must be varied according to the nature of the colour to be used. A lixivium made with horse's or dog's urine, with four parts quick-lime, and one part pot-ashes, is excellent for some colours; common lye of wood-ashes does very well for others: for some, spirit of wine is best; and finally, for others, oily liquors, or common white-wine.

The colours which have been found to succeed best with the peculiar menstrua, are these: stone blue dissolved in six times the quantity of spirit of wine, or of the urinous lixivium; and that colour which the painters call litmouse, dissolved in common lye of wood-ashes. An extract of saffron, and that colour made of buckthorn-berries, and called by the painters sap-green, both succeed well dissolved in urine and quick lime, and tolerably well in spirit of wine. Vermillion, and a fine powder of cochineal, succeed also very well in the same liquors. Dragon's blood succeeds very well in spirit of wine, as does also a tincture of logwood in the same spirit. Alkanet-root gives a fine colour, but the only menstruum to be used for this is oil of turpentine; for neither spirit of wine, nor any lixivium, will do with it. There is another kind of sanguis draconis, called dragon's blood

blood in tears, which, mixed with urine alone, gives a very elegant colour. Besides these mixtures of colours and menstrua, there are some colours which are to be laid on dry and unmixed. These are dragon's blood, of the purest kind, for a red; gamboge for a yellow; green wax for a green; common brimstone, pitch and turpentine for a brown colour. The marble, for these experiments, must be made considerably hot, and then the colours are to be rubbed on dry in the lump. Some of these colours, when once given, remain immutable; others are easily changed or destroyed. Thus the red colour given by dragon's blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the polish of the marble not hurt by it. A fine gold-colour is given in the following manner: take crude sal armoniac, vitriol and verdegrease, of each equal quantities; white vitriol succeeds best, and all must be thoroughly mixed in fine powder.

The staining of marble to all the degrees of red or yellow, by solutions of dragon's blood or gamboge, may be done by reducing these gums to powder, and grinding them, with the spirit of wine, in a glass mortar: but for smaller attempts, no method is so good as the mixing a little of either of these powders with spirit of wine in a silver spoon, and holding it over burning charcoal. By this means a fine tincture will be extracted, and with a pencil dipped in this, the finest traces may be made on the marble, while cold, which, on the heating it afterwards, either on sand, or in a baker's oven, will all sink very deep, and remain perfectly distinct in the stone. It is very easy to make the ground colour of the marble red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteness is to remain with some white paint, or even with two or three doubles only of paper, either of which will prevent the colour from penetrating in that part. All the degrees of red are to be given to marble by means of this gum alone; a slight tincture of it, without the assistance of heat to the marble, gives only a pale flesh colour, but the stronger tinctures give it yet deeper; to this the assistance of heat adds yet greatly; and finally, the addition of a little pitch to the tincture gives it a tendency to blackness,

or any degree of deep red that is desired. A blue colour may be given also to marble by dissolving turnsol in a lixivium of lime and urine, or in the volatile spirit of urine; but this has always a tendency to purple, whether made by the one or the other of these ways. A better blue, and used in an easier manner, is furnished by the canary-turnsol, a substance well known among the dyers: this needs only to be dissolved in water, and drawn on the place with a pencil; this penetrates very deep into the marble, and the colour may be increased by drawing the pencil wetted afresh several times over the same lines. This colour is subject to spread and diffuse itself irregularly; but it may be kept in regular bounds, by circumscribing its lines with beds of wax, or any other such substance.

Polishing of MARBLES is performed by first rubbing them well with a free-stone, or sand, till the strokes of the axe are worn off, then with pumice-stone, and afterwards with emery.

Arundel-MARBLES, antient marbles with a chronicle of the city of Athens inscribed on them, many years before our Saviour's birth; presented to the university of Oxford by Thomas earl of Arundel, whence the name.

MARBLING, in general, the painting any thing with veins and clouds, so as to represent those of marble.

Marbling of books or paper is performed thus: dissolve four ounces of gum arabic into two quarts of fair water; then provide several colours mixed with water in pots or shells, and with pencils peculiar to each colour, sprinkle them by way of intermixture upon the gum-water, which must be put into a trough, or some broad vessel; then with a stick curl them, or draw them out in streaks, to as much variety as may be done. Having done this, hold your book or books close together, and only dip the edges in, on the top of the water and colours, very lightly; which done, take them off, and the plain impression of the colours in mixture will be upon the leaves; doing as well the ends as the front of the book in the like manner.

After the same manner you may make marbled paper, by dipping it on the flat, as also linen cloth, &c.

Marbling a book on the covers is performed by forming clouds with aqua fortis, or spirit of vitriol mixed with ink, and

and afterwards glazing the covers. See the article BOOK-BINDING.

MARCASITES, *marcasitæ*, in natural history, are defined to be compound inflammable metallic bodies, of a hard and solid substance, of an obscurely and irregularly foliaceous structure, of a bright glittering appearance, naturally constituting whole strata, though sometimes found in detached masses; very freely giving fire with steel; not fermenting with acid menstruums; and when put into the fire, yielding a blue sulphureous flame, and afterwards calcining into a purple powder. There are only three known species of this genus: 1. The silver-coloured marcasite, found in vast abundance in lead and tin-mines. 2. The gold coloured marcasite. 3. The heavy pale-white marcasite.

Marcasites were at first supposed to be almost all pure gold or silver, according to their colour; but experience has shewn, that if they contain any metal at all, no method has hitherto been found of working them to advantage. In Germany, indeed, they extract sulphur and vitriol from the silver marcasite, which two substances are always contained in it; and besides these, it has usually a quantity of arsenic. It has been recommended as a styptic, after being calcined; but as the arsenic may not be all carried off by that operation, its use as a medicine seems extremely dangerous.

MARCGRAVE, or **MARGRAVE**, a degree of honour in Germany answering to our marquis. See **MARQUIS**.

MARCGRAVIA, in botany, a genus of the polyandria-monogynia class of plants, the corolla whereof consists of a single petal, of a conico-oval figure; and its fruit is a globose berry, with a single cell, containing a great number of very small seeds.

MARCH, in chronology, the third month of the year, consisting of thirty-one days. See the articles **MONTH** and **YEAR**.

MARCHANTIA, in botany, a genus of the cryptogamia class of plants, the corolla of which is monopetalous, turbinated, and shorter than the cup; in the lower cavity of which there are contained several naked seeds, of a roundish but compressed figure.

MARCHE, a territory of Lyonois, in France, having Berry on the north, Bourbonnois and Auvergne on the east, Limosin on the south, and Poictou on the west.

MARCHE is also a town of Lorrain, subject to

France: east longitude $5^{\circ} 45'$, north latitude $48^{\circ} 10'$.

MARCHIENNES, a town of the austrian Netherlands, on the confines of Namur, three miles west of Charleroy; east long. $4^{\circ} 20'$, north lat. $50^{\circ} 26'$.

MARCHPURG, a town of Germany, in the circle of Austria and dutchy of Stiria; west long. $15^{\circ} 50'$, north lat. 47° .

MARCIONITES, christian heretics in the II^d century, thus denominated from their leader Marcion, who maintained, that there were two principles or Gods, a good and a bad one. Origen affirms, that he held there was a God of the jews, a God of the christians, and a God of the gentiles. It is said that he denied the resurrection of the body, condemned marriage, and taught that our Saviour, when he descended into hell, discharged Cain, the Sodomites, and other impious wretches out of that place of torment. He rejected all the Old Testament, and received only part of St. Luke's Gospel, and ten of St. Paul's Epistles, in the New.

MARCOSIANS, a sect of christian heretics in the II^d century, so called from their leader Marcus, who represented the supreme God as consisting not of a trinity, but a quaternity, *viz.* the ineffable, silence, the father, and truth. He held two principles, denied the reality of Christ's sufferings, and the resurrection of the body, and had the same fancies concerning the æons as Valentinus. See the articles **ÆON** and **VALENTINIANS**. The marcosians, it is said, made pretences to greater perfection than either St. Peter or St. Paul; and being persuaded that nothing could hinder their salvation, freely indulged themselves in the practice of vice.

MARDIKE, a port-town of french Flanders, four miles west of Dunkirk.

MARDIERS, or **TOPASSES**, a mixed breed of Dutch, Portuguese, Indians, and other nations, incorporated with the Dutch at Batavia, in the East Indies.

MARE, the female of the horse-kind. See the article **HORSE**.

Such mares as are designed for breeding, ought to be as free from defects as possible, and should, no more than the stallions, have either moon-eyes, watery eyes, or bloodshot-eyes; they should have no splint, spavin, or curb, nor any natural imperfection, for the colts will take after them: but choice should be made of the best and ablest, the most high spirited, best coloured, and finest shaped;

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and the natural defects that may be in the stallion, should be amended in the mare, as well as that which is amiss in the mare should be amended in the stallion.

As for her age, she may be covered when three years old; but the most convenient time is after four, when she will nourish her colt best; and though she may breed till she is thirteen, yet she is not fit for it when she is past ten, for the colt of an old mare is commonly heavy. Before a mare is covered, she should be in the house about six weeks, during which time she should be well fed with good hay and oats well sifted; and in order to render her conception the more certain, near a quart of blood may be taken from each side of her neck, about five or six days before covering. Another method to bring a mare in season, and make her retain, is to give her, for the space of eight days before you bring her to the horse, about two quarts of hemp-seed in the morning, and as much at night; and if she refuses to eat it, to mingle it with a little bran or oats, or else to let her fast for a while: and if the stallion also eat of it, it will greatly contribute to generation.

Mares go with foal eleven months and as many days as they are years old, and therefore the properest time for covering them is in the beginning of June, that she may foal the May following, when there will be plenty of grass, which will afford the mares a great abundance of milk, for nourishing their foals: but a mare should never be covered while she is bringing up her foal, because the foal to which she is giving suck, as well as that in her belly, will be prejudiced by it, and she herself sooner spent. After covering, let her, for three weeks or a month, have the same diet as before, and be kept clean in the stable till the middle of May, with her feet well pared and thin shod: take her in again about the latter end of September, if not before, and keep her to the end of her foaling. If she cannot readily bring forth, hold her nostrils so as to stop her taking wind; and if that will not do, dissolve madder, to the quantity of a walnut, in a pint of ale, and give it her warm. In case she cannot void her secundine, or after-burden, boil two or three handfuls of fennel in running water, then put half a pint of that liquor into as much sack, or, for want thereof, into a pint of ale, with a fourth part of salad oil, mixed together, and pour it lukewarm into her nostrils, hold-

ing them close for some time. Otherwise give her green wheat, or rye, the last of which is best.

If the mare has but little milk, boil as much as you can get from her, with the leaves of lavender and spike, and bathe the udder with it warm, till the knobs and knots are dissolved. She should now drink only white water, which is bran put into water; give her also sweet mashes; and a month after foaling let her have a mash with some brimstone or favin in it.

MARGA, MARLE, in natural history. See the article MARLE.

MARGARETTA, one of the largest of the Leeward-islands; it is about 50 miles long, and twenty four broad, and is situated sixty miles north of the continent of Paria, or New Andalusia, in South America: west long. 64° , and north lat. $11^{\circ} 30'$.

MARGARITA, the PEARL, in natural history. See the article PEARL.

MARGATE, a port-town of Kent, in the isle of Thanet, 12 miles north of Deal.

MARGENTHEIM, or MERGENTHEIM, a city of Germany, in the circle of Franconia: east long. $9^{\circ} 40'$, and north lat. $49^{\circ} 32'$.

MARIENBURG, a town of the french Netherlands, in the province of Hainalt, ten miles west of Charlemont.

MARIENBURG is also a town of polish Prussia, 20 miles south-east of Dantzic.

MARIGNAN, a city and port-town of Brazil, the capital of the captainship of Marignan, situated at the mouth of the river St. Mary: west longitude 44° , and south latitude $2^{\circ} 15'$.

MARINER, the same with sailor or seaman. See SAILORS and SEAMEN.

MARINO, a city of Italy, in the dutchy of Urbino, the capital of the territory of Marino, a little state or commonwealth, situated on a mountain in the middle of the pope's territories: east long. $13^{\circ} 30'$, and north lat. 44° .

MARINO is also a town of Italy, in the Campania of Rome, eight miles east of that city.

MARJORAM, *marjorana*, in botany, &c. See the article MARJORANA.

MARITIME, something relating to, or bounded by the sea: thus, a maritime province, or country, is one bounded by the sea; and a maritime kingdom, or state, is one that makes a considerable figure, or is very powerful at sea. Hence, by maritime powers, among the european states,

states, are understood Great Britain and Holland. See the articles NAVAL AFFAIRS, NAVIGATION, &c.

MARK, in commerce, a certain note which a merchant puts upon his goods, or upon the cask, hoghead, &c. that contains them, in order to distinguish them from others, such as a grape, a crow's foot, a diamond, a cross, an asterisk, &c. Some use one or other of these marks by themselves; others join them with the initial letters of their own name, and others use the letters only.

St. MARK the evangelist's day, a festival of the christian church, observed April 25.

St. MARK's Gospel, a canonical book of the New Testament, being one of the four Gospels.

St. Mark wrote his Gospel at Rome, where he accompanied St. Peter, in the year of Christ 44. Tertullian and others pretend, that St. Mark was no more than an amanuensis to St. Peter, who dictated this Gospel to him; others affirm, that he wrote it after St. Peter's death. Nor are the learned less divided as to the language this Gospel was wrote in; some affirming it was composed in greek, others in latin. Several of the antient heretics received only the Gospel of St. Mark: others among the catholics rejected the twelve last verses of this Gospel. The Gospel of St. Mark is properly an abridgment of that of St. Matthew.

Canons of St. MARK, a congregation of regular canons, founded at Mantua, by Albert Spinola a priest, towards the end of the XIIth century. Spinola made a rule for them, which was approved, corrected, and confirmed by several succeeding popes. About the year 1450, they were reformed, and followed only the rule of St. Augustine. This congregation having flourished for the space of four hundred years, declined by little and little, and is now become extinct.

Knights of St. MARK, an order of knight-hood in the republic of Venice, under the protection of St. Mark the evangelist. The arms of the order are, gules, a lion winged, or, with this device, PAX TIBI MARCE EVANGELISTA. This order is never conferred but on those who have done signal service to the commonwealth.

MARK, or **MARC**, also denotes a weight used in several states of Europe, and for several commodities, especially gold and silver. In France, the mark is divided into 8 ounces, or 64 drachms, or 192 den-

niers or penny-weights, or 160 esterlines, or 300 mailles, or 640 felins, or 4608 grains. In Holland the mark-weight is also called troy-weight, and is equal to that of France. When gold and silver are sold by the mark, it is divided into 24 carats. See the article CARACT.

MARK is also used among us for a money of account, and in some other countries for a coin.

The english mark is two thirds of a pound sterling, or 13s. 4d. and the scotch mark is of equal value in scotch money of account. The mark-lubs, or lubeck-mark, used at Hamburgh, is also a money of account, equal to one third of the rix-dollar, or to the french livre: each mark is divided into sixteen sols-lubs. Mark-lubs is also a danish coin equal to 16 sols-lubs. Mark is also a copper and silver coin in Sweden. See COIN.

MARKET, a public place in a city or town, in which live cattle, provisions, or other goods, are set to sale; and also a privilege, either by grant or prescription, by which a town is enabled to keep a market.

A market is less than a fair, and is commonly held once or twice a week. According to Bracton, one market ought to be distant from all others at least six miles and a half and a third of a half: but no market is to be kept within seven miles of the city of London; but all butchers, victuallers, &c. may hire stalls and standings in the flesh-markets there, and sell meat and other provisions, four days in a week. Every person who has a market, is entitled to receive toll for the things sold in it; and, by antient custom, for things standing in the market, though nothing be sold: but by keeping a market in any other manner than it is granted, or extorting of toll or fees, where none are due, they may be forfeited.

MARKET-JEW, a market-town of Cornwall, situated on Mountbay, ten miles east of the Land's end.

MARLBRO, or **MARLBOROUGH**, a borough town of Wiltshire, eighteen miles north of Salisbury.

It sends two members to parliament.

MARLBRO-FORT, an english factory on the west coast of the island of Sumatra, three miles east of Bencoolen: east long. 101°, and south lat. 4° 15'.

MARLE, *marga*, in natural history, is an earth but slightly coherent, not ductile, stiff, or viscid while moist, most easily diffu

diffusible in, and disunited by water, and by it reduced into a soft, loose, incoherent mass.

Among the different kinds of marle, there is one that has a place in the catalogues of the materia medica, which is known in the german shops under the name of *mar-ga*, or *marla*; this is sometimes white, and at others flesh-coloured: but the earth is the same under either of these appearances. It is of a compact, smooth, and somewhat glossy surface, and when small pieces of it are rubbed between the fingers, it very easily moulders into a fine impalpable powder. This is esteemed as an astringent, and is given as such in diarrhoeas, dysenteries, and hæmorrhages; the red kind is preferred for the last intention; but the difference between this and the white is not worth regarding. The Germans also give it in fevers, in convulsions, and particularly in epileptic cases, and in internal bruises: but we are apt to believe, that too many virtues are ascribed to it.

Marle, used as a manure, is of very great service to lands, especially to such as are sandy and loose: marls are of different qualities in the different counties of England, and are chiefly distinguished by their colour; but the properties of any sort of marle are better judged of, by its purity, and by its dissolving in wet or frost; for if it is fat and tender, and will open the land it is laid on, it may be taken for granted that it will be beneficial to it. Some advise burning the marle before it is laid on the land, by which means one load will go as far as five. The quantity of marle ought to be in proportion to the depth of the earth; and over-marling has often proved of worse consequence than under-marling, especially where the land is strong; but in sandy land there can be no danger in laying on a great quantity, or repeating it often. Marles do not improve lands the first year so much as they do afterwards.

MARLI, a town of France, ten miles north-west of Paris, remarkable for a royal palace, and a very complex machine for raising water.

This machine, if Mr. Bernouilli's computation be right, must be a very bad one, since, according to him, no less than $\frac{5}{8}$ parts of its absolute force is lost.

MARLOW, a borough-town of Buckinghamshire, fifteen miles south of Ailesbury. It sends two members to parliament.

MARMALADE, a confection of plumbs,

apricots, quinces, &c. boiled with sugar to a consistence.

MARMOR, **MARBLE**. See **MARBLE**.

MARMORA, a little island of Turkey, situated in the sea of Marmora, to which it gives name, lying sixty miles south-west of Constantinople.

MARMOTTE, in zoology, the largest animal of the mus or rat-kind, with a long naked tail and tawney body: it is near as big as a hare, and breeds only on the tops of mountains in Switzerland. Its feet are somewhat like those of a bear. See plate CLXX. fig. 2.

MARNE, a considerable river of France, which, rising in the south-east of Champagne, falls into the river Seine, near Paris.

MARONITES, in church history, a sect of christians near mount Libanus in Syria, who are in communion with the church of Rome, and have their patriarch, archbishops, bishops, &c.

MAROSCH, or **MERISH**, a great river, which, rising in the Carpathian mountains, runs through Transilvania and Hungary, and falls into the river Teyse at Segedin.

MARPURG, a city of Germany, forty miles north of Francfort: east long. 8° , $40'$, and north lat. 50° $40'$.

MARQUE, or *Letters of MARQUE*, in military affairs, are letters of reprisal, granting the subjects of one prince or state liberty to make reprisals on those of another.

Letters of marque among us, are extraordinary commissions granted by authority, for reparation to merchants, taken and despoiled by strangers at sea; and reprisals is only the retaking, or taking of one thing for another.

In the prosecution of these letters there must be, 1. The oath of the person injured, or other sufficient proof, touching the injury sustained. 2. A proof of due prosecution for satisfaction in a legal way. 3. The deferring or denial of justice. 4. A complaint to his own prince or state. 5. A requisition of justice made to the supreme head of the state. After all which, letters of reprisal, under certain restrictions, are issued; but if the supreme power think these letters of reprisal may affect the peace of the state, they are put off till a more convenient time.

For the distribution of such prizes as are taken, in consequence of these letters of marque, see the article **PRIZE**.

MARQUETRY, or **INLAID-WORK**, is a cu-

a curious work composed of several fine hard pieces of wood, of various colours, fastened in thin slices on a ground, and sometimes enriched with other matters, as silver, brass, tortoise-shell, and ivory; with these assistances the art is now capable of imitating any thing; whence it is by some called the art of painting in wood.

The ground on which the pieces are to be arranged and glued, is usually of well-dried oak or deal, and is composed of several pieces glued together, to prevent its warping. The wood to be used in marquetry is reduced into leaves, of the thickness of a line, or the twelfth part of an inch, and is either of its natural colour, or stained, or made black to form the shades by other methods: this some perform by putting it in sand heated very hot over the fire: others, by steeping it in lime water and sublimate; and others, in oil of sulphur. The wood being of the proper colours, the contours of the pieces are formed according to the parts of the design they are to represent: this is the most difficult part of marquetry, and that which requires the most patience and attention.

The two chief instruments used in this work, are a saw and a wooden vice, which has one of its chaps fixed, and the other moveable, which is open and shut by the foot, by means of a cord fastened to a treddle. See plate CLXX. fig. 4.

The leaves to be formed, of which there are frequently three, four, or more joined together, are, after they have been glued on the outermost part of the design, whose profile they are to follow, put within the chaps of the vice; then the workman pressing the treddle, and thus holding fast the piece, with his saw runs over all the out-lines of his design. By thus joining or forming three or four pieces together, not only time is saved, but also the matter is the better enabled to sustain the effort of the saw, which, how fine soever it may be, and how slightly soever it may be conducted by the workman, except this precaution were taken, would be apt to raise splinters, and ruin the beauty of the work. All the pieces having been thus formed by the saw, and marked, in order to their being known again, each is vaneered, or fastened in its place, on the common ground, with the best english glue; and this being done, the whole is set in a press to dry, planed over, and polished with the skin of the sea-dog,

wax, and shave-grass; as in simple vaneering, and the fine branches and more delicate parts of the figures are touched up and finished with a graver.

MARQUIS, a title of honour, next in dignity to that of duke, first given to those who commanded the marches, that is the borders and frontiers of countries. Marquisses were not known in England till king Richard II. in the year 1337, created his great favourite, Robert Vere, the earl of Oxford, marquis of Dublin; since which time there have been many creations of this sort, though at present there is but one english, three scotch and one irish marquisses. The manner of creating a marquis differs in nothing from that of a duke, except the difference of the titles, and the marquis's being conducted by a marquis and an earl, while a duke is led by a duke and a marquis: he is also girt with a sword, has a gold verge put into his hand, and his robe or mantle is the same as those of a duke, with only this difference, that a duke's mantle has four guards of ermine, and a marquis's only three and a half. The title given him, in the style of the heralds, is most noble and potent prince. His cap is the same as a duke's, and the difference between their coronets consists in the duke's being adorned with only flowers or leaves, while the marquis's has flowers and pyramids with pearls on them, intermixed to shew that he is a degree between a duke and an earl.

MARR, that part of Aberdeenshire situated between the rivers Dee and Don. See the article ABERDEEN.

MARRIAGE, a contract both civil and religious, between a man and a woman, by which they engage to live together in mutual love and friendship, for the ends of procreation, &c.

The first inhabitants of Greece lived together without marriage. Cecrops, king of Athens, was the first author of this honourable institution among that people. After the commonwealths of Greece were settled, marriage was very much encouraged by their laws, and the abstaining from it was discountenanced, and in many places punished. The Lacedemonians were particularly remarkable for their severity towards those who deferred marrying, as well as to those who wholly abstained from it. The Athenians had an express law, that all commanders, orators, and persons entrusted with any public affairs, should be married men. Polygamy,

gamy, or the having more than one wife at a time, was not commonly tolerated in Greece. See POLYGAMY.

The time of marriage was not the same in all places; the particular number of years to which they were limited, depended upon the humour of each law-giver, nothing being generally agreed on in this matter. The season of the year the most proper for marriage, was thought to be the winter, and especially the month of January. See GAMELION, &c.

The Greeks thought it scandalous to contract marriage within certain degrees of consanguinity; whilst most of the barbarous nations allowed incestuous mixtures. Most of the grecian states required that citizens should match with none but citizens; and the children were not allowed to marry without the consent of their parents; when there were orphan-virgins without any inheritance, the next of kin was obliged to marry them, or to settle a portion on them according to his quality.

The Romans, as well as the Greeks, disallowed of polygamy. A Roman might not marry any woman who was not a Roman. It was thought dishonourable for a woman to marry twice. Among the Romans the kalends, nones, and ides of each month were thought unlucky to be married in, as was also the feast of the parentalia, or feralia, and the whole month of May was reckoned the most unhappy season.

We find but few laws in the books of Moses concerning the institution of marriage: he restrained the Israelites from marrying within certain degrees of consanguinity; but we find that polygamy, though not expressly allowed is however tacitly implied in the laws of Moses: there is a particular law that obliged a man, whose brother died without issue, to marry his widow, and raise up children to his brother. The Hebrews purchased their wives, by paying down a competent dowry for them; and a man was at liberty to marry, not only in any of the twelve tribes, but even out of them, provided it was with such nations as used circumcision.

The antient christian church laid several restraints upon her members in relation to marriage; such was the rule forbidding christians to marry with infidels and heathens; another restraint related to the consanguinity and affinity prohibited in scripture: a third was, that children un-

der age should not marry without the consent of their parents, guardians, or next relations: and another was, that there should be some parity of condition between the contracting parties. They not only condemned polygamy, but even reckoned it unlawful to marry after a divorce. As to the season in which marriage might or might not be celebrated in the christian church, all we find is, that it was forbidden in lent. The romish church requires of the clergy perpetual abstinence from marriage; and has advanced this institution to the dignity of a sacrament. The church of England, though she does not consider marriage as a sacrament, yet looks upon it as an institution so sacred, as that it ought always to be celebrated by an ecclesiastical person; but marriages, without this sanction, are not therefore null and void. There is no canon of this church, which forbids marriages to be solemnized at any time. The canonical hours for celebrating of matrimony, are from eight to twelve in the forenoon. The impediments to marriage are specified in Canon CII. of this church, and are these: 1. A preceding marriage, or contract; or any controversy or suit depending on the same. 2. Consanguinity or affinity. 3. Want of consent of parents, or guardians. For the several ceremonies regarding marriages, see BRIDE, BRIDEGROOM, NUP-TIAL RITES, HUSBAND, &c.

Marriage, according to our law, cannot be dissolved but by death, breach of faith, or other notorious misbehaviour. It is requisite to complete a marriage, that there be a free and mutual consent between the parties. The marriages performed by romish priests, whose orders are acknowledged by the church of England, are deemed good in some instances; but they ought to be solemnized agreeable to the rites of our own church, to be entitled to the benefits attending on marriage here, such as dower, thirds, &c. A marriage in reputation, as among the quakers, is allowed to be sufficient to give title to a personal estate; though in the case of a person married by a dissenting minister, who was not in orders, it has been held that where a husband demands a right due to him as such by the ecclesiastical law, he ought to prove himself a husband, thereby to be entitled to it; and yet this marriage is not altogether a nullity, because by the laws of nature, the contract is binding. On a promise of mar-

marriage, if it be mutual on both sides, damages may be recovered in case either party refuses to marry: and though no time for the marriage is agreed on, if the plaintiff avers that he offered to marry the defendant, who refused it, an action is maintainable for the damages: but no action shall be brought upon any agreement, except it is in writing, and signed by the party to be charged.

For the better preventing clandestine marriages, and the inconveniencies arising therefrom, an act of parliament lately passed, wherein the following regulations were made, *viz.* That from and after March 25, 1754, banns of matrimony shall be published in the parish church or some public chapel belonging to the parish wherein the parties dwell, upon three Sundays before the marriage, during the time of service, immediately after the second lesson: and where the parties dwell in different parishes, the banns shall be published in both; and the marriage shall be solemnized in the church or chapel wherein the banns were published, and no where else; and it is also required, that both or either of the parties to be married, do reside four weeks at least in the parish where the banns are published. Nothing in this act deprives the archbishop of Canterbury of his usual right of granting special licences to marry at any convenient time or place. All marriages solemnized contrary to the foresaid regulations, shall be void; and the person solemnizing the same, shall be adjudged guilty of felony, and be transported for fourteen years to his majesty's colonies. Marriages solemnized by licence, where either of the parties (not being a widow or widower) shall be under age, without the consent of the father first had (if living) or of the guardians or one of them, and where there shall be no guardians, of the mother (if living and unmarried) or of the guardian appointed by chancery, shall be void to all intents and purposes. Where any such guardian shall be non compos mentis, or in parts beyond the sea, or shall refuse their consent to a proper match, the party may apply by petition to the lord chancellor, lord keeper, or lords commissioners of the great seal, who shall proceed on such a petition in a summary way; and where the marriage proposed shall appear to be proper, they shall judicially declare the same to be so by an order of court, which shall be deemed effectual. All marriages shall

be solemnized in the presence of two or more creditable witnesses besides the minister; and an entry thereof shall be immediately made in a register kept for that purpose. This act shall not extend to the marriages of any of the royal family, nor to Scotland, nor to those persons called quakers, nor those professing the jewish religion.

Policy of encouraging MARRIAGE. Dr. Hally observes, that the growth and increase of mankind is not so much stunted by any thing in the nature of the species, as it is from the cautious difficulty most people make to adventure on the state of marriage, from the prospect of the trouble and charge of providing for a family: nor are the poorer sort of people herein to be blamed, who besides themselves and families, are obliged to work for the proprietors of the lands that feed them; and of such does the greater part of mankind consist. Were it not for the backwardness to marriage, there might be four times as many births as we find; for by computation from the table, given under the article MORTALITY, there are 15000 persons above sixteen and under forty-five, of which, at least, 7000 are women capable of bearing children; yet there are only 1238, or little more than a sixth part of these, that breed yearly: whereas were they all married, it is highly probable that four of six should bring forth a child every year, the political consequences of which are evident. Therefore, as the strength and glory of a kingdom or state consist in the multitude of subjects, celibacy above all things ought to be discouraged, as by extraordinary taxing or military service: and, on the contrary, those who have numerous families should be allowed certain privileges and immunities, like the *jus trium liberorum* among the Romans; and especially, by effectually providing for the subsistence of the poor.

MARROW, *medulla*, in anatomy, a soft oleaginous substance contained in the cavity of the bones.

The marrow of the bones, which anatomists of many ages took to be a mere shapeless and irregular mass of matter, is found in reality to consist of a number of fine subtle fat oleaginous substances, and of a number of minute vesicles of a membranaceous structure, in which it is secreted from the arterial blood in the same manner as the fat of the rest of the body. It is contained in a greater or lesser

leffer quantity in the cavities of most of the cylindrical bones: in the cavernous bones there is not properly any marrow, but a kind of red, fatty, medullary juice. The medullary vessels, found running here and there through their appropriated canals, penetrate into the inner cavity of the bones, and secrete the medullary part from the blood there; the blood being afterwards returned again by the veins. The nerves are distributed to the same places for the sake of sense and motion. It has been a common opinion, that the marrow increased and decreased in quantity according to the increase and decrease of the moon; but this is by modern anatomists thought idle and erroneous; it does, indeed, increase and decrease in its several cavities, according to the exercise or rest of the animal, or to its eating more or less, or better or worse food. This subtile oleaginous substance penetrates in between the fibres of the bones, and preserves them from dryness and from that brittleness which would be the consequence of it; but it does not nourish them as was originally believed. See BONE.

MARRUBIUM, **HOARHOUND** and **BASTARD-DITTANY**, in botany, a genus of the didynamia-gymnospermia class of plants, with a monopetalous ringent flower, the upper lip of which is erect, semibifid, and acute, and the under lip reflex and semitrifid: the seeds are four, and contained in the cup.

Hoarhound is reputed attenuant and resolvent, and accordingly prescribed in moist asthma, and in all diseases of the breast and lungs. There used to be a compound syrup of it kept in the shops, but it is now out of use.

MARS, in astronomy, one of the superior planets, moving round the sun in an orbit between those of the earth and jupiter. See the article **PLANET**.

For the diameter of this planet, and its mean distance from the sun, see the articles **DIAMETER** and **DISTANCE**.

The character of this planet is ♂, the excentricity of its orbit is 141, supposing the distance of the earth from the sun 1000 equal parts; the inclination of its orbit to that of the earth is $1^{\circ} 51'$; the periodical time in which it performs its revolution round the sun, is 686 days, 23 hours, 27', 30"; its revolution round its own axis 24 hours, 40'; and its parallax, 30". See the articles **CHARACTER**, **EXCENTRICITY**, &c.

In the achronical rising of this planet, that is, when it is in opposition to the sun, it is found twice as near the earth as the sun, which is a phaenomenon that has greatly discredited the ptolemaic hypothesis. This planet, as well as the rest, borrows its light from the sun, and has its increase and decrease of light like the moon; and it may be seen almost bisected when in its quadratures with the sun, or in its perigæon; but is never corniculated or falcated, as the inferior planets.

Dr. Hook, in 1665, observed several spots in this planet, which having a motion, he concluded the planet to have a turbinated motion round its center. In 1666, M. Cassini observed several spots in the two hemispheres of mars, which, by continuing his different observations very diligently, he found to move by little and little from east to west, and to return in the space of 24 hours 40' to their former situation. Whence both the motion and period or natural day of that planet were determined. See the article **MACULÆ**.

Mars always appears with a ruddy troubled light, whence we conclude that it is encompassed with a thick cloudy atmosphere, which by disturbing the rays of light in their passage and re-passage through it, occasion that appearance; besides the ruddy colour of mars, we have another argument of his being encompassed with an atmosphere, and it is this, that when any of the fixed stars are seen near his body, they appear extremely obscured and almost extinct; and if this be the case, a spectator in mars would scarce ever see mercury, unless perhaps in the sun at the time of conjunction, when mercury passes over his disk, as he sometimes appears to us, in form of a spot. An eye in mars will see venus at about the same distance from the sun as mercury appears to us, and the earth about the same distance from the sun that venus appears to us; and when the earth is found in conjunction with and very near the sun, the eye in mars will see the earth horned or falcated, and its attendant, the moon, of the same figure, and at its utmost distance from the earth not above fifteen minutes of a degree: and as this planet's distance from the sun is to the distance of the earth and sun as $1\frac{1}{2}$ to 1, therefore a spectator in mars would see the sun's diameter less by one third than it appears to us, and consequently the degree

degree of light and heat which mars receives from the sun, is less by one third than that received by the earth; this proportion will, however, admit of a sensible variation, on account of the great excentricity of this planet.

Though the period or year of this planet, as has been already observed, is nearly twice as long as ours, and his natural day, or the time in which the sun appears above the horizon (setting aside the consideration of twilight) is almost every where equal to his night; yet it appears that in one and the same place, on his surface, there will be but very little variety of seasons, or scarce any difference of summer and winter: and the reason is, that the axis of his diurnal rotation is nearly at right angles with the plane of his orbit. It will be found, notwithstanding, that places situated in different latitudes, that is, at different distances from his equator, will have very different degrees of heat, on account of the different inclination of the sun's rays to the horizon, as it is with us when the sun is in the equinoxes.

From this consideration Dr. Gregory endeavours to account for the appearance of the fasciæ in mars, which are certain swaths or fillets seen in this planet, and posited parallel to his equator: for as among us, the same climates has at different seasons very unequal degrees of heat, but as in mars it is otherwise, the same parallel having always a pretty equable degree of heat, it follows, that these spots may probably be formed in mars, or in his atmosphere, as snow and clouds are in ours, viz. by the constant different intentions of heat and cold in the different parallels, and so come to be extended in circles or belts parallel to his equator, or the circle of his diurnal motion. And this same principle may, perhaps, solve the phænomenon of jupiters belts, that planet, like mars, having a perpetual equinox. See JUPITER.

MARS, among chemists, denotes iron, as being supposed to be under the influence of that planet. See the article IRON.

Crocus of MARS. See the article CROCUS.

Crystals of MARS. See the article CRYSTALS of Mars.

Flowers of MARS. See the article FLOS.

Tree of MARS, *arbor martis*, in chemistry, a species of metallic vegetation, the process of making which is this: dissolve steel filings in spirit of nitre, and to the solution add oil of tartar per deliquium:

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by this means a fermentation will be excited, which being over, there will be formed beautiful vegetations about the surface, expressing the branches of trees. MARSALA, a port-town of Sicily, in the province of Mazara: east long. $12^{\circ} 6'$, north lat. $37^{\circ} 50'$.

MARSALQUIVER, a port-town of Algiers, on the coast of Barbary, situated on a bay of the sea, opposite to Oran.

MARSEILLES, a city and port of Provence, situated on a fine bay of the Mediterranean, twenty-five miles north-west of Toulon: east long. $5^{\circ} 20'$, north lat. $43^{\circ} 15'$.

MARSHAL, in its primary signification, means an officer who has the command or care of horses; but it is now applied to officers who have very different employments, as earl marshal, knight marshal, or marshal of the king's house, &c. See the articles EARL-MARSHAL, KNIGHT-MARSHAL, &c.

MARSHAL of the king's bench, an officer who has the custody of the king's bench-prison in Southwark. This officer is obliged to give his attendance, and to take into his custody all persons committed by that court.

MARSHAL of the exchequer, an officer to whom that court commits the king's debtors.

MARSHAL of the king's hall, an officer who has the care of placing the household-servants and strangers at table, according to their quality.

MARSHAL, or MARESCHAL, of France, an officer of the greatest dignity in the french armies. When two or more marshals are in the army, the eldest commands.

MARSHALLING a coat, in heraldry, is the disposal of several coats of arms belonging to distinct families, in one and the same escutcheon or shield, together with their ornaments, parts, and appurtenances.

MARSHFIELD, a market-town of Wiltshire, thirty-miles north-west of Salisbury.

MARSHLAND, the west division of Norfolk. See the article NORFOLK.

MARSHMALLOW, *alibæa*, in botany and medicine. See the article ALTHÆA.

MARSHY LANDS, those liable to be overflowed by the sea, or large rivers, for the draining of which, see the articles DITCH, DRAIN, &c.

As marshy lands fatten cattle the soonest of any, and preserve sheep from the rot, it would be a great improvement of them

to raise a cross or semicircular bank of earth in them, and to plant this with trees, which might afford shelter to the cattle, a thing very much wanted in all of them.

MARSICO, a city of Italy, seventy miles south-east of Naples.

MARSILEA, in botany, a genus of the cryptogamia class of plants, without any corolla or cup: the antheræ are four, and placed on an obtusely conic body: the fruit is of a roundish figure, consisting of four cells, in each of which are contained several roundish seeds.

Under this genus are comprehended the *salvinia* of Micheli, and *pilularia* of Dillenius.

MARSUPIALIS MUSCULUS, in anatomy, a muscle otherwise called the internal obturator. See **OBTURATOR**.

MARTABAN, a city and port-town of the further India, on the east side of the bay of Bengal: east long 97° , north lat. $16^{\circ} 10'$.

MARTES, the martin, in zoology. See the article **MARTIN**.

St. MARTHA, a city and port-town of Terra Firma, in South America, and the capital of the province of St. Martha: west long. $74^{\circ} 30'$, north lat. $11^{\circ} 45'$.

MARTIAL, among physicians, an appellation given to the preparations of iron. See the article **IRON**.

MARTIAL LAW, is the law of war, which entirely depends on the arbitrary power of the prince, or of those to whom he has delegated it. For though the king can make no laws in time of peace without the consent of parliament, yet in time of war he uses an absolute power over the army.

MARTIGUES, a port-town of Provence, in France, situated on a bay of the Mediterranean, sixteen miles west of Marseilles.

MARTIN, *martes*, in zoology, a species of mustela, of a blackish brown colour, and with a pale throat: it is about the size of the common cat, but more slender. See the article **MUSTELA**.

MARTIN is also the name of a bird of the hirundo-kind, of a black colour, and with the throat white. See **HIRUNDO**.

Cape MARTIN, a promontory of Valencia, in Spain, on the Mediterranean: it is under the meridian of London: north lat. $38^{\circ} 50'$.

MARTINGALE, in the manege, a thong of leather, fastened to one end of the girths under the belly of a horse, and at

the other end to the muls-roll, to keep him from rearing.

MARTINICO, the chief of the french Caribbee-islands, situated in 61° of west long. and between 14° and 15° north lat. It is sixty miles long, but is scarce twenty broad in any part.

MARTLETS, in heraldry, little birds represented without feet, and used as a difference or mark of distinction for younger brothers, to put them in mind that they are to trust to the wings of virtue and merit, in order to raise themselves, and not to their feet, they having little land to set their foot on. See plate **CLXV**. fig. 4.

MARTNETS, in a ship, small lines fastened to the leech of a sail, reeved through a block on the top-mast head, and coming down by the mast to the deck. Their use is to bring the leech of the sail close to the yard to be furled.

MARTYNIA, in botany, a genus of the didynamia-angiospermia class of plants, with a monopetalous flower, campanulated, gibbous at the base, and containing a honey-juice: the fruit is an oblong capsule, containing four seeds of the same figure.

MARTYR, in the christian sense of the word, is one who lays down his life for the gospel, or suffers death for the sake of his religion.

The christian church has abounded in martyrs, and history is filled with surprising accounts of their singular constancy and fortitude under the cruelest torments human nature was capable of suffering. The primitive christians were accused by their enemies of paying a sort of divine worship to the martyrs. Of this we have an instance in the answer of the church of Smyrna to the suggestion of the Jews, who, at the martyrdom of Polycarp, desired the heathen judge not to suffer the christians to carry off his body, lest they should leave their crucified master, and worship him in his stead. To which they answered. "We can
" neither forsake Christ, nor worship
" any other: for we worship him as the
" son of God; but love the martyrs as
" the disciples and followers of the Lord,
" for the great affection they have shewn
" to their king and master." A like answer was given at the martyrdom of Fructuosus in Spain. For when the judge asked Eulogius, his deacon, whether he would not worship Fructuosus, as think-
ing

ing that though he refused to worship the heathen idols, he might yet be inclined to worship a christian martyr; Eulogius replied, " I do not worship Fructuosus, " but him whom Fructuosus worships."

The primitive christians believed, that the martyrs enjoyed very singular privileges: that upon their death they were immediately admitted to the beatific vision, while other souls waited for the completion of their happiness till the day of judgment: and that God would grant chiefly to their prayers the hastening of his kingdom, and shortening the times of persecution.

The churches built over the graves of the martyrs, and called by their names, in order to preserve the memory of their sufferings, were distinguished by the title martyrion, confessio, or memoria.

The festivals of the martyrs are of very antient date in the christian church, and may be carried back at least till the time of Polycarp, who suffered martyrdom about the year of Christ 168. On these days the Christians met at the graves of the martyrs, and offered prayers and thanksgivings to God for the examples they had afforded them: they celebrated the eucharist, and gave alms to the poor; which, together with a panegyric oration or sermon, and reading the acts of the martyrs, were the spiritual exercises of these anniversaries.

MARTYROLOGY, in the church of Rome, is a catalogue or list of martyrs, including the history of their lives and sufferings for the sake of religion.

The martyrologies draw their materials from the kalendars of particular churches, in which the several festivals dedicated to them are marked; and which seem to be derived from the practice of the antient Romans, who inserted the names of heroes and great men in their fasti, or public registers.

The martyrologies are very numerous, and contain many ridiculous and even contradictory narratives; which is easily accounted for, if we consider how many forged and spurious accounts of the lives of saints and martyrs appeared in the first ages of the church, which the legendary writers afterwards adopted without examining into the truth of them. However some good critics, of late years, have gone a great way towards clearing the lives of the saints and martyrs from the

monstrous heap of fiction they laboured under. See the article **LEGEND**.

MARVEL of *Peru*, in botany, a name used by some for jalap. See **JALAP**.

MARY MAGDALEN'S DAY, a festival of the romish church, observed on the twenty-second of July.

MARYGOLD, or **MARSH-MARYGOLD**, a plant called by botanists caltha. See the article **CALTHA**.

Corn **MARYGOLD**, chrysanthemum. See the article **CHRYSANTHEMUM**.

French **MARYGOLD**, in botany, tagetes. See the article **TAGETES**.

MARYLAND, one of the british plantations in North America, situated between 74° and 78° west long. and between 38° and 40° north lat.

MASANDERAN, a province of Persia, situated on the southern coast of the Caspian sea, and usually comprehended in Gilan.

MASCON, or **MACON**, a city of France, in the dutchy of Burgundy, thirty-five miles north of Lyons.

MASCULINE, or **MASCULINE GENDER**, among grammarians, that belonging to the male. See the article **GENDER**.

MASHAM, a market-town of Yorkshire, situated twenty-four miles north-west of the city of York.

MASIER, or **MESIER**, a town of France, in the province of Champaign, situated on the river Maes, thirty-five miles north-east of Rheims.

MASK, or **MASQUE**. See the article **MASQUE**.

MASON, a person employed under the direction of an architect, in the raising of a stone-building.

The chief business of a mason is to make the mortar; raise the walls from the foundation to the top, with the necessary retreats and perpendiculars; to form the vaults, and employ the stones as delivered to him. When the stones are large, the business of hewing or cutting them belongs to the stone-cutters, though these are frequently confounded with masons: the ornaments of sculpture are performed by carvers in stones or sculptors. The tools or implements principally used by them are the square, level, plumb-line, bevel, compass, hammer, chissel, mallet, saw, trowel, &c. See **SQUARE**, &c.

Besides the common instruments used in the hand, they have likewise machines for raising of great burdens, and the con-

ducting of large stones, the principal of which are the lever, pully, wheel, crane, &c. See the article LEVER, &c.

Free and accepted MASONS, a very antient society or body of men, so called, either from some extraordinary knowledge of masonry or building, which they are supposed to be masters of, or because the first founders of the society were persons of that profession. These are now very considerable, both for number and character, being found in every country in Europe, and consisting principally of persons of merit and consideration. As to antiquity, they lay claim to a standing of some thousand years. What the end of their institution is, seems still in some measure a secret; and they are said to be admitted into the fraternity by being put in possession of a great number of secrets, called the mason's word, which have been religiously kept from age to age, being never divulged.

MASONRY, in general, a branch of architecture, consisting in the art of hewing or squaring stones, and cutting them level or perpendicular, for the uses of building: but in a more limited sense, masonry is the art of assembling and joining stones together with mortar.

Hence arises as many different kinds of masonry, as there are different forms and manners for laying or joining stones. Vitruvius mentions seven kinds of masonry used among the antients, three of hewed stone, *viz.* that in form of a net, that in binding, and that called the greek masonry; and three of unhewed stones, *viz.* that of an equal course, that of an unequal course, and that filled up in the middle; and the seventh was a composition of all the rest, each in their order.

Net-masonry, called by Vitruvius *reticulatum*, from its resemblance to the meshes of a net, consists of stones squared in their courses, and so disposed as that their joints go obliquely; and their diagonals are the one perpendicular, and the other level. This is the most agreeable masonry to the eye, but is very apt to crack. See plate CLXX. fig. 6. n° 1.

Bound masonry, that in which the stones were placed one over another like tiles: the joints of their beds being level; and the mounters perpendicular, so that the joint that mounts and separates two stones, always falls directly over the middle of the stone below. This is less beautiful than the net work, but it is

more solid and durable. See *ibid.* n° 2. Greek masonry, according to Vitruvius, is that where after we have laid two stones, each of which makes a course, another is laid at the end, which makes two courses, and the same order is observed throughout the building; this may be called double binding, in regard the binding is not only of stones of the same course with one another, but likewise of one course with another course. *Ibid.* n° 3.

Masonry by equal courses, called by the antients *isodomum*, differs in nothing from the bound masonry but only in this, that its stones are not hewn. *Ibid.* n° 4.

Masonry by unequal courses, called *pseudisodomum*, is also made of unhewed stones, and laid in bound work; but then they are not of the same thickness, nor is there any equality observed, excepting in the several courses; the courses themselves being unequal to each other. *Ibid.* n° 5.

Masonry filled up in the middle, called by the antients *emplection*, is likewise made of unhewed stones, and by courses: but the stones are only set in order as to the courses; the middle being filled up with stones thrown in at random among the mortar. *Ibid.* n° 6.

Compound masonry is of Vitruvius's proposing, so called as being formed of all the rest. In this the courses are of hewed stone; and the middle being left void, is filled up with mortar and pebbles thrown in together: after this the stones of one course are bound to those of another course with cramp irons fastened with melted lead. *Ibid.* n° 7.

All the kinds of masonry now in use may be reduced to these five, *viz.* bound masonry; that of brick-work, where the bodies and projectures of the stones inclose square spaces or pannels, &c. set with bricks; that *de moilon*, or small work, where the courses are equal, well squared, and their edges or beds rusticated; that where the courses are unequal; and that filled up in the middle with little stones and mortar.

MASQUE, or MASK, a cover for the face, with suitable apertures for the eyes and mouth.

MASQUES, in architecture, denotes certain grotesque faces, used to fill vacant places, as friezes, pannels of doors, keys of arches, &c.

MASQUERADE, an assembly of persons masked, and dressed in peculiar habits, meeting

Fig. 1. MADREPORA.



Fig. 2. MARMOTTE.



Fig. 4. MARQUETRY.

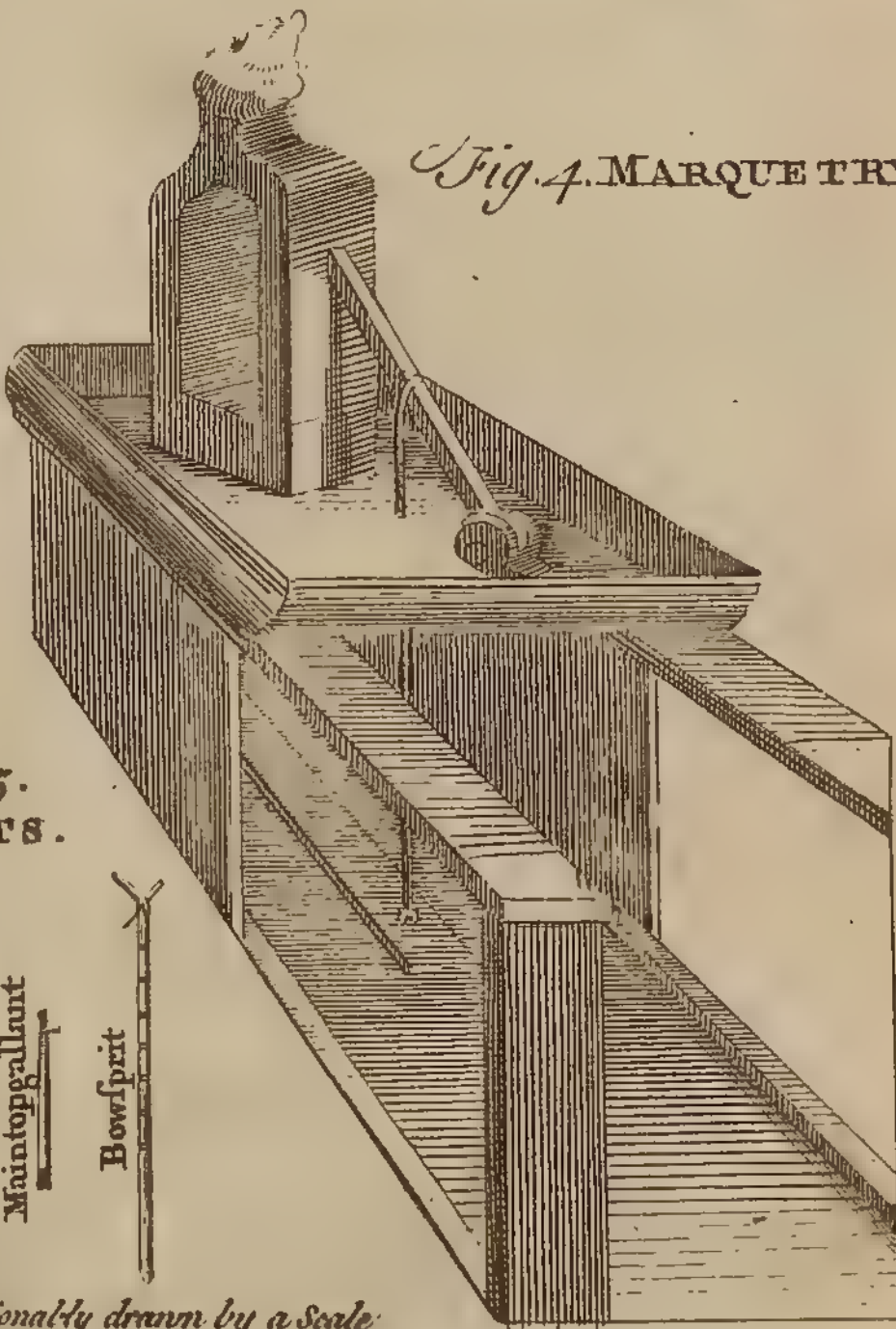


Fig. 3. MANTELETS.

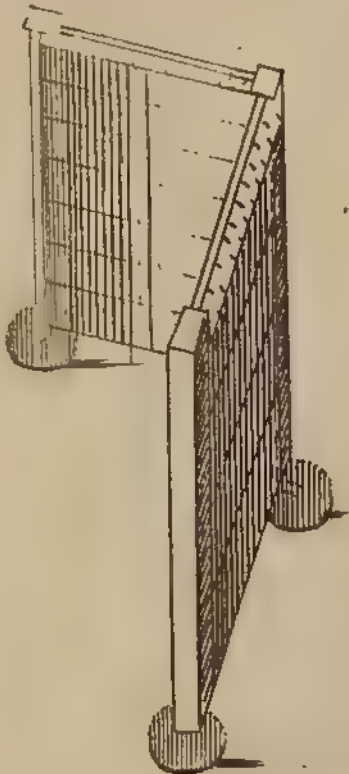


Fig. 5. MASTS.

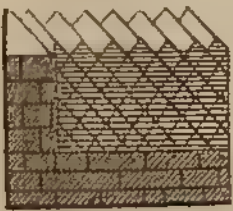


Proportionally drawn by a Scale of $\frac{1}{2}$ inch to 100 feet Statute-measure.

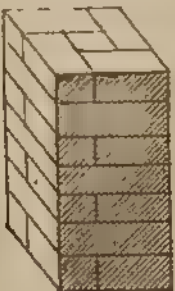
Fig. 6. MASONRY.

Bound Masonry

Net-Masonry

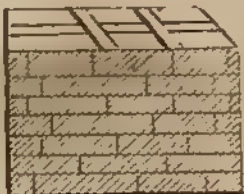


N^o 1.



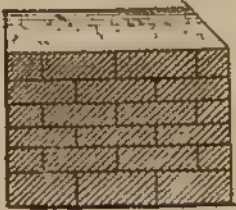
N^o 2.

Greek Masonry



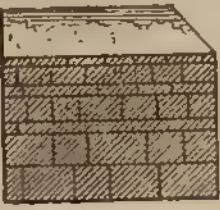
N^o 3.

Masonry by equal Courses



N^o 4.

Masonry by unequal Courses



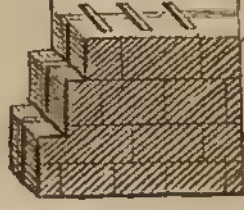
N^o 5.

Masonry fill'd up in the Middle



N^o 6.

Compound Masonry



N^o 7.

J. Jefferys sculp

meeting to dance and divert themselves. **MASS**, *missa*, in the church of Rome, the office or prayers used at the celebration of the eucharist; or in other words, consecrating the bread and wine into the body and blood of Christ, and offering them so transubstantiated, as an expiatory sacrifice for the quick and the dead. As the mass is in general believed to be a representation of the passion of our blessed Saviour, so every action of the priest, and every particular part of the service, is supposed to allude to the particular circumstances of his passion and death.

The general division of masses consists in high and low; the first is that sung by the choristers, and celebrated with the assistance of a deacon and sub-deacon: low masses are those in which the prayers are barely rehearsed without singing.

There are a great number of different or occasional masses in the romish church, many of which have nothing peculiar but the name: such are the masses of the saints; that of St. Mary of the snow, celebrated on the fifth of August; that of St. Margaret, patroness of lying-in women; that of the feast of St. John the baptist, at which are said three masses; that of the Innocents, at which the gloria in excelsis, and the hallelujah are omitted, and it being a day of mourning, the altar is of a violet-colour. As to ordinary masses some are said for the dead, and, it is supposed, contribute to fetch the soul out of purgatory; at these masses the altar is put in mourning, and the only decorations are a cross in the midst of six yellow wax-lights: the dress of the celebrant, and the very mass-book are black: many parts of the office are omitted, and the people are dismissed without the benediction. If the mass be said for a person distinguished by his rank or virtues, it is followed with a funeral oration: they erect a chapelle ardente, that is, a representation of the deceased, with branches and tapers of yellow wax, either in the middle of the church, or near the deceased's tomb, where the priest pronounces a solemn absolution of the deceased. There are likewise private masses, said for stolen or strayed goods or cattle; for health; for travellers, &c. which go under the name of votive masses. There is still a further distinction of masses denominated from the countries in which they were used; thus the gothic mass, or *missa mosarabum*,

is that used among the Goths when they were masters of Spain, and which is still kept up at Toledo and Salamanca; the ambrosian mass is that composed by St. Ambrose, and used only at Milan, of which city he was bishop; the gallic mass, used by the antient Gauls; and the roman mass, used by almost all the churches in the romish communion.

Mass of the præsantified, missa præsantificatorum, is a mass peculiar to the greek church, in which there is no consecration of the elements; but after singing some hymns, they receive the bread and wine which was before consecrated. This mass is performed all Lent, except on Saturdays, Sundays, and the annunciation. The priest counts upon his fingers the days of the ensuing week on which it is to be celebrated, and cuts off as many pieces of bread at the altar, as he is to say masses; and after having consecrated them, steep them in wine, and then puts them in a box; out of which, upon every occasion, he takes some of it with a spoon, and putting it on a dish, sets it upon the altar.

MASSA, a city of Italy, on the south-side of the gulph of Naples, twenty miles south of that capital.

MASSA, the capital of the dutchy of Massa Carara, in Italy, situated between the territories of Lucca and Genoa: east long. $10^{\circ} 40'$, north lat. $43^{\circ} 55'$.

MASSA is also a town of Italy, in the dutchy of Tuscany: east long. $11^{\circ} 50'$, north lat. $43^{\circ} 5'$.

MASSACHUSET-COLONY, the principal sub-division of New-England, is bounded by New-Hampshire, on the north; by the Atlantic ocean, on the east and south; and by Connecticut and New-York, on the west. It is about 100 miles long, and 40 broad.

MASSALIANS, a set of enthusiasts who sprang up about the year 361, in the reign of the emperor Constantius, who maintained that men have two souls, a celestial and a diabolical, and that the latter is driven out by prayer. They pretended to prophecy, and affirmed that they could see the trinity with their corporeal eyes; and believed that the holy ghost descended visibly upon them, especially at the time of their ordination, when they trod the devil under foot, and danced upon him.

MASSETER, in anatomy, a muscle which has its origin in the lower and interior part of the jugum, and its end at the external

ternal superficies of the angle of the jaw. The ductus stenonianus, or salival duct of Steno, passes over this muscle.

MASSIVE, among builders, an epithet given to whatever is too heavy and solid: thus a massive column, is one too short and thick for the order whose capital it bears; and a massive wall, is one whose openings or lights are too small in proportion.

MASSORA, in matters of literature, a critical work, containing remarks on the verses, words, letters, and vowel-points of the hebrew-text of the bible; a work more laborious than useful, such poor observations being beneath the notice of men of learning.

MASSOVIA, or **WARSOVIA**. See the article **WARSOVIA**.

MAST, in naval architecture, a large timber in a ship, for sustaining the yards, sails, &c. See the article **SHIP**.

In large vessels there are four masts, viz. the main mast, fore-mast, mizen-mast, and bowsprit. The main-mast is the principal one, standing in the middle of the ship: its length, according to some, should be $2\frac{1}{2}$ that of the midship-beam. Others give the following rule for finding its length, viz. multiply the breadth of the ship, in feet, by 24; from the product, cut off the last figure towards the right-hand; and the rest will be the length required. Thus suppose the length of the midship beam was 30 feet; then $30 \times 24 = 720$, from which cutting off the last figure, there remains 72 feet for the length of the main-mast. And as for the thickness of the main-mast, it is usual to allow an inch to every yard in length.

In plate CLXX. fig. 5. the reader will see a first rate's main-mast, main-top, main-top-gallant, and bowsprit, drawn proportionally by a scale of $\frac{1}{12}$ of an inch to 100 feet statute measure.

For the proportions, &c. of the fore-mast and mizen, see the articles **FORE-MAST** and **MIZEN**.

MASTER, *magister*, in general; is a title of authority; as the grand master of Malta, the master of St. Lazarus, &c. The Romans had a great many officers thus denominated; as the master of the people, or dictator; the master of the cavalry, foot, census, &c. See the articles **DIKTATOR**, **CAVALRY**, &c.

MASTER of arts, is the first degree taken up in foreign universities, and for the

most part in those of Scotland; but the second in Oxford and Cambridge; candidates not being admitted to it, till they have studied seven years in the university. See the article **DEGREE**.

MASTER of the ceremonies. See the article **CEREMONY**.

MASTERS in chancery, in ordinary, of which there are twelve, the master of the rolls being chief, are usually chosen out of the barristers of the common law, and sit in chancery, or at the rolls, as assistants to the lord chancellor and master of the rolls.

To them are also committed interlocutory reports, stating of accounts, taking costs, &c. And sometimes by way of reference, they are empowered to make a final determination of causes.

They have, time out of mind, had the honour to sit in the lords house, without either writ or patent to empower them. They formerly inspected all writs of summons, which is now performed by the clerk of the petty bag. Messages from the lords to the commons are carried by them. Affidavits are made before them, and deeds and recognizances acknowledged.

There are also masters in chancery extraordinary, appointed by the lord chancellor in the several counties of England, for taking affidavits, recognizances, &c. for the ease of the suitors of the court.

MASTER of the faculties, an officer under the archbishop of Canterbury, who grants licences and dispensations.

MASTER-GUNNER. See **GUNNER**.

MASTER of the horse, a great officer of the crown, who orders all matters relating to the king's stables races, breed of horses; and commands the equerries and all the other officers and tradesmen employed in the king's stables. His coaches, horses, and attendants are the king's, and bear the king's arms and livery.

MASTER of the ordnance, a great officer, who has the chief command of the king's ordnance and artillery.

MASTER of the revels, an officer who orders all things relating to the performance of plays, masks, balls, &c. at court.

MASTER of the rolls, a patent officer for life, who has the custody of the rolls of parliament and patents which pass the great-seal, and of the records of chancery, as also commissions, deeds, recognizances, which, being made of rolls of parchment, gave rise to the name.

In

In absence of the chancellor he sits as judge in the court of chancery: at other times he hears causes in the rolls-chapel, and makes orders; but all hearings before him are appealable to the chancellor. He hath a writ of summons to parliament, and sits on the second wooll-pack next the lord chief justice.

In his gift are the six clerks in chancery, the examiners, three clerks of the petty bag, and the six clerks of the rolls-chapel, where the rolls are kept, and the rolls-house for his habitation, &c.

MASTER of a ship, the same with captain in a merchant-man; but in a king's ship he is an officer who inspects the provisions and stores, and acquaints the captain of what is not good, takes particular care of the rigging and of the ballast, and gives directions for stowing the hold; he navigates the ship under the directions of his superior officer; sees that the log and log-book be duly kept; observes the appearances of coasts, and notes down in his journal any new shoal or rocks under water, with their bearing and depth of water, &c.

MASTER at arms in a king's ship, an officer who daily, by turns, as the captain appoints, is to exercise the petty officers and ship's company; to place and relieve sentinels; to see the candles and fire put out according to the captain's orders; to take care the small arms are kept in good order, and to observe the directions of the lieutenant at arms.

MASTER of the Temple, since the dissolution of the order of the templars, the spiritual guide and pastor of the Temple is so called, which was the denomination of the founder and his successors.

MASTER of the wardrobe, an officer under the lord chamberlain, who has the care of the royal robes, as well as the wearing apparel, collar, george, and garter, &c. He has also the charge of all former kings and queens robes remaining in the Tower, all hangings, bedding, &c. for the king's house, the charge and delivery of velvet and scarlet allowed for liveries. He has under him a clerk of the robes, wardrobe keeper, a yeoman, &c.

MASTER-PIECE, *chef d'oeuvre*, is particularly used among the French, for a piece of work done by those who desire to be admitted master of any art or trade, by way of specimen of their capacity.

MASTER-WORT, in botany. See the article **IMPERATORIA**.

Quarter-MASTER. See **QUARTER**.

MASTICATION, *masticatio*, in medicine, the action of chewing, or of agitating the solid parts of our food between the teeth, by means of the motion of the jaws, the tongue, and the lips, whereby it is broken into small pieces, impregnated with saliva, and so fitted for deglutition and a more easy digestion.

MASTICATORIES, in medicine, such remedies as are taken in at the mouth, and chewed in order to promote the evacuation of the salival humour, as tobacco, ginger, pepper, sage, rosemary, thyme, mastich, &c.

MASTICH, in the materia medica, a solid resin, of a pale, yellow, white colour, brought to us principally from the island of Chios, in drops or tears as it naturally forms itself in exsuding from the tree, about the bigness and much in the form of a pea. It is to be chosen clear, pellucid, and of a pale yellowish colour, well scented, and brittle. We meet with a kind of cement sometimes kept in the shops under the name of mastich. It is composed of mastich and several other ingredients, and is formed into cakes for use. This is intended for the service of the lapidaries, to fill up cracks in stones, and for other such purposes: but is by no means to be used as mastich for any of the medicinal purposes.

Mastich is detergent, astringent, and stomachic; it is greatly recommended in inveterate coughs and against spitting of blood. It strengthens the stomach, assists digestion, and stops vomiting. It is used externally in plasters to the regions of the stomach and intestines; and is said to stop vomiting and purgings, by any means.

MASTIGADOUR, **MASTICADOUR**, or **SLABBERING BIT**, in the manege, a snaffle of iron, all smooth, and of a piece, guarded with paternosters, and composed of three halves of great rings, made into demi-ovals; of unequal bigness; the lesser being inclosed within the greater, which ought to be about half a foot high. See the article **BIT**.

MASTOIDES, in anatomy, the same with *mammillaris*; being applied to such processes in the body as have the appearance of breasts or dugs, arising in a broad basis, and terminating in an obtuse top. Mastoides is sometimes applied to the muscle which stoops the head, proceeding from the neck-bone and breast-bone, and terminating in the process of the mam-

mammiformis. See the articles MAMMILLARY and MUSCLE.

MASULIPATAN, a city and port-town of the hither India: east long. 81° , and north lat. $16^{\circ} 18'$.

MATAGORDA, a fortress at the entrance of the harbour of Cadiz.

MATAMAN, a country in the south-west of Africa, bounded by Benguelo, on the north; by Manomotapa, on the east; by Caffraria, on the south; and by the Atlantic ocean, on the west.

MATAPAN-CAPE, in the Morea, the south-most promontory of Europe, situated in east long. 22° , north lat. 36° .

MATARO, a town of Spain, situated on the coast of Catalonia, twelve miles east of Barcelona.

MATCH, a kind of rope slightly twisted, and prepared to retain fire for the uses of artillery, mines, fire-works, &c.

It is made of hempen tow, spun on the wheel like cord, but very slack; and is composed of three twists, which are afterwards again covered with tow, so that the twists do not appear: lastly, it is boiled in the lees of old wines. This, when once lighted at the end, burns on gradually and regularly, without ever going out, till the whole be consumed: the hardest and driest match is generally the best.

MATCHING, in the wine trade, the preparing vessels to preserve wines and other liquors, without their growing sour or vapid. The method of doing it, as directed by Dr. Shaw, is as follows: melt brimstone in an iron ladle, and when thoroughly melted, dip into it slips of coarse linen-cloth; take these out, and let them cool: this the wine-coopers call a match; take one of these matches, set one end of it on fire, and put it into the bung hole of a cask; stop it loosely, and thus suffer the match to burn nearly out: then drive in the bung tight, and set the cask aside for an hour or two. At the end of this time examine the cask, and you will find that the sulphur has communicated a violent pungent and suffocating scent to the cask, with a considerable degree of acidity, which is the gas and acid spirit of the sulphur. The cask may after this be filled with a small wine, which has scarce done its fermentation, and bunging it down tight, it will be kept good, and will soon clarify: this is a common and very useful method,

for many poor wines could scarce be kept potable even a few months without it.

MATER *Tenuis*, or *Pia* MATER. See the articles MENINGES and *PIA* MATER.

MATER DURA, or *dura* MATER. See also MENINGES and DURA MATER.

MATERA, a town of Italy, in the kingdom of Naples and territory of Otranto, situated thirty miles south-west of Barri.

MATERAN, the capital of a kingdom of the same name; situated on the south coast of the island of Java. This city is said to lye in east long. 110° , south lat. $7^{\circ} 45'$.

MATERIA SUBTILIS, denotes a fine subtile matter which the Cartesians suppose to pervade and penetrate freely the pores of all bodies, to fill up all their pores so as not to leave the least vacuity or interstice between them; they had recourse to this machine to support the doctrine of an absolute plenum, and to make it consistent with the phænomenon of motion, &c. See CARTESIAN PHILOSOPHY, PLENUM and VACUUM.

MATERIA CHEMICA, a term used by authors to express such bodies as are the peculiar objects of chemical experiments. See LABORATORY and CHEMISTRY.

MATERIA MEDICA, comprehends all the substances either used in medicine in their natural state, or which afford preparations that are so; these belong partly to the animal, partly to the vegetable, and partly to the fossil kingdom. See the articles ANIMAL, VEGETABLE and FOSSIL.

The preparations and virtues of all which are delivered under their respective articles, but in as concise and scrupulous a manner as we possibly could; since we cannot but remark, with the great Boyle, that it is too frequent in writers on the materia medica, to give us rather encomiums than impartial accounts of the simples they treat of. However, the same great author prefers the use of approved simples to that of compound medicines, because one or other of the ingredients may have different operations from those intended by the physician: and he adds, that he had so many unwelcome proofs of this himself, that he thought it his duty to caution others against the like inconvenience.

MATHEMATICS, from *μαθημα*, originally signified any discipline or learning; but, at present, denotes that science which teaches, or contemplates, what-

whatever is capable of being numbered or measured, in so far as computable or measurable; and, accordingly, is subdivided into arithmetic, which has numbers for its object, and geometry, which treats of magnitude: See the articles ARITHMETIC and GEOMETRY.

Mathematics are commonly distinguished into pure and speculative, which consider quantity abstractedly; and mixed, which treat of magnitude as subsisting in material bodies, and consequently are interwoven every where with physical considerations:

Mixed mathematics are very comprehensive; since to them may be referred astronomy, optics, geography, hydrography, hydrostatics, mechanics, fortification, navigation, &c. See the articles ASTRONOMY, OPTICS, &c.

Pure mathematics have one peculiar advantage, that they occasion no disputes among wrangling disputants, as in other branches of knowledge; and the reason is, because the definitions of the terms are premised, and every body that reads a proposition has the same idea of every part of it. Hence it is easy to put an end to all mathematical controversies, by shewing, either that our adversary has not stuck to his definitions, or has not laid down true premises; or else that he has drawn false conclusions from true principles; and in case we are able to do neither of these, we must acknowledge the truth of what he has proved.

It is true, that in mixed mathematics, where we reason mathematically upon physical subjects, we cannot give such just definitions as the geometers: we must therefore rest content with descriptions; and they will be of the same use as definitions, provided we are consistent with ourselves, and always mean the same thing by those terms we have once explained.

Dr. Barrow gives a most elegant description of the excellence and usefulness of mathematical knowledge, in his inaugural oration, upon being appointed professor of mathematics at Cambridge.

The mathematics, he observes, effectually exercise, not vainly delude, nor vexatiously torment studious minds with obscure subtilties; but plainly demonstrate every thing within their reach, draw certain conclusions, instruct by profitable rules, and unfold pleasant questions.

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These disciplines likewise enure, and corroborate the mind to a constant diligence in study; they wholly deliver us from a credulous simplicity, most strongly fortify us against the vanity of scepticism, effectually restrain us from a rash presumption, most easily incline us to a due assent, perfectly subject us to the government of right reason. While the mind is abstracted and elevated from sensible matter, distinctly views pure forms, conceives the beauty of ideas, and investigates the harmony of proportions; the manners themselves are sensibly corrected and improved, the affections composed and rectified, the fancy calmed and settled, and the understanding raised and excited to more divine contemplation.

MATRASS, CUCURBIT, or BOLT HEAD, amongst chemists. See CUCURBIT.

MATRICARIA, FEVERFEW, in botany, a genus of the syngenesia polygamia superflua class of plants, the compound flower of which is radiated, the hermaphrodite flowers are tubulose and numerous, placed on an hemispherical disc: the female ones are ligulated and placed in the radius: the seeds are oblong, naked and solitary, being contained in the cup, and placed on a convex, naked receptacle. See plate CLXXI. fig. 1.

This plant has always been allowed one of the first places among the hysteric and uterine plants. It has been prescribed in powder from a scruple to half a dram for a dose, but the much better way is in slight infusion made in the manner of tea. Taken in the same manner for a continuance of time, it will bring the menses, though subject to be interrupted and irregular, to their true period, and will remove a number of complaints, the natural consequences of such an irregularity. It is an agreeable carminative and bitter; it strengthens the stomach and disperses flatulencies; and the expressed juice is said to kill worms in the bowels. Hoffman praises it as a febrifuge.

MATRICE, or MATRIX. See the article MATRIX.

MATRICULA, a register kept of the admission of officers and persons entered into any body or society, whereof a list is made.

This word was formerly applied to a kind of almshouse where the poor were provided for, having certain revenues appropriated to it for that purpose.

MATRIX, in anatomy, the same with uterus. See the article **UTERUS**.

MATRIX, in letter-foundery. See the article **FOUNDRY**.

MATRONALIA, a festival of the antient roman matrons, from whom it had its name. It was celebrated on the kalends of March in honour of the god Mars: and was to the roman ladies what the festival of the saturnalia was to their husbands; for at this time they served their women slaves at tables, and received presents from their husbands. See the article **SATURNALIA**.

There are two reasons given for its institution: its being kept in remembrance of the peace concluded between the Romans and Sabines by the mediation of the women; or of Ilia, the mother of Romulus, being with child by Mars.

MATROSSES, are soldiers in the train of artillery, who are next to the gunners, and assist them in loading, firing and spunging the great guns. They carry fire-locks, and march along with the store-waggons, both as a guard, and to give their assistance in case a waggon should break down.

MATT, in a ship, rope-yard, junk, &c. beat flat and interwoven; used in order to preserve the yards from galling or rubbing in hoisting or lowering them.

MATTADORE, in playing at ombre. See the article **OMBRE**.

MATTAGESS, in ornithology, a name by which the greater butcher-bird is sometimes called.

MATTER, *materia*, in physiology, whatever is extended and capable of making resistance; hence, because all bodies, whether solid or fluid, are extended, and do resist, we conclude that they are material, or made up of matter. The Cartesians, it is true, make matter to consist in extension alone; but extension, without resistance, is nothing but mere space. That matter is one and the same thing in all bodies, and that all the variety we observe arises from the various forms and shapes it puts on, seems very probable, and may be concluded from a general observation of the procedure of nature in the generation and destruction of bodies. Thus, for instance, water, rarified by heat, becomes vapour; great collections of vapours form clouds; these condensed descend in the form of hail or rain; part of this collected on the earth constitutes

rivers; another part mixing with the earth enters into the roots of plants, and supplies matter to, and expands itself into various species of vegetables. In each vegetable it appears in one shape in the root, another in the stalk, another in the flowers, another in the seeds, &c. From hence various bodies proceed; from the oak, houses, ships, &c. from hemp and flax we have thread; from thence our various kinds of linen; from thence garments; these degenerate into rags, which receive from the mill the various forms of paper; hence our books; which by fire are converted partly into water, partly into oil, another part into air, a fourth part into salt, and a fifth into earth; which are called the elements of bodies; and which, mixed with common earth, are again resuscitated in various forms of bodies.

According to Sir Isaac Newton, it seems highly probable, that God in the beginning formed matter into solid, massy, impenetrable, moveable particles, or atoms, of such sizes and figures, and with such other properties, and in such proportion to space, as most conduced to the end for which he formed them; and that these primitive particles being solids, are incomparably harder than any porous bodies compounded of them, even so hard as never to wear or break in pieces; no ordinary power being able to divide what God himself made one in the first creation. While these particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of things depending on them may be changed. Water and earth, composed of old worn particles and fragments of particles, would not be of the same nature and texture now, with water and earth composed of intire particles in the beginning; and therefore, that nature may be lasting, the changes of corporeal things are to be placed only in the various separations and new associations of motions of these permanent particles, compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together, and only touch in a few points. See the article **ATOM**.

The elements, or principles of matter,

to which all bodies are ultimately reducible, have been already mentioned under the article ELEMENT.

And the existence, laws and properties of matter have been treated of under the articles ESSENCE, EXISTENCE, INERTIA, EXTENSION, DIVISIBILITY, GRAVITATION, EXPERIMENTAL PHILOSOPHY, &c.

MATTER *in deed*, in law, signifies a particular matter of fact to be proved by some deed; and is frequently mentioned with matter of record; as where a man, during his absence abroad in the king's service, is sued to an exigent; in which case, if such person would take advantage of this matter in deed, he must allege it before a scire facias for execution is awarded against him, otherwise he can have no relief but from matter of record; that is, some error in the proceedings appearing upon the face of the record.

A difference is likewise made between matter in deed, matter of record, and nude matter; which last is a naked allegation of a thing done, proved by witnesses only, and neither by record nor deed.

MATTHEW, or *Gospel of St. MATTHEW*, a canonical book of the New Testament.

St. Matthew wrote his gospel in Judea, at the request of those he had converted, and it is thought he began it in the year 41, eight years after Christ's resurrection. It was written, according to the testimony of all the antients, in the hebrew or syriac language, which was then common in Judea; but the greek version of it, which now passes for the original, is as old as the apostolical times. St. Matthew's view in writing his gospel, was chiefly to shew the royal descent of Jesus Christ, and to represent his life and conversation among men. No one of the apostles enters so far into the particulars of the actions of Jesus Christ, or has given so many rules for the conduct of life. If we compare him with the other three evangelists, we may observe a remarkable difference in the order and succession of our Saviour's actions, from chap. iv. to chap. xiv. 13. Some have imputed this variation of St. Matthew to mere chance; and others to choice and design: however, it can be no prejudice to the truth of the facts, which are the

essential part of the gospel; and as to the order of time, the sacred authors were not always solicitous about it.

St. MATTHEW *the Evangelist's day*, a festival of the christian church, observed on September 21.

St. MATTHEW, in geography, a small island on the coast of Guinea, planted by the Portugueze, but deserted: west long. 9°, south lat. 2° 30'.

St. MATTHIAS's day, a festival of the christian church, observed on the 24th of February.

MATTHIOLA, in botany, a genus of plants not reduced to any class; its flower is said to be tubular, with an undivided limb; its stamina five subulated filaments, and its fruit a globose drupe, coronated with the cup, and containing a nut and kernel of the same shape with itself.

MATTINS, the first canonical hour, or the first part of the daily service in the romish church.

MATTURANTS, *maturantia*, in pharmacy, medicines which promote the suppuration of tumours. See the article SUPPURATIVES.

MATURATION, in surgery, the same with suppuration. See the article SUPPURATION.

MAUBEUGE, a town of the Austrian Netherlands, in the province of Hainault, eleven miles south of Mons.

MAULEON, a town of Gascony in France, seventeen miles south-east of Bayonne.

MAUNCH, in heraldry, the figure of an ancient coat sleeve, borne in many gentlemen's escutcheons.

MAUNDY-THURSDAY, is the Thursday in Passion-week, which was called Maunday or Mandate-thursday, from the command which our Saviour gave his apostles to commemorate him in the Lord's supper, which he this day instituted; or from the new commandment which he gave them to love one another, after he had washed their feet as a token of his love to them.

Our Saviour's humility in washing his disciples feet, is commemorated on this day by most christian kings; who wash the feet of a certain number of poor people, not indeed with their own royal hands, but by the hands of their lord almoner, or some other deputy.

St. MAURA, an island of the Mediterranean, situated between the province of Epirus and the island of Cephalonia;

subject to Venice: east long. 21° , north lat. $38^{\circ} 50'$.

MAURICE, or **MORITIUS**, an island in the Indian ocean, subject to the Dutch: east long. 56° , south lat. 20° .

MAURIENNE ST. JOHN, the capital of the territory of Maurienne, in Savoy, east long. $6^{\circ} 10'$, north lat. $45^{\circ} 18'$.

MAURITANIA, the antient name of the coast of Barbary, from the city of Tangier to that of Algiers; the west part of it, in which Tangier stands, was called Mauritania Tingitana; and that farther east, Mauritania Cæsariensis.

MAUSOLEUM, a magnificent tomb, or funeral monument. The word is derived from Mausolus, king of Caria, to whom Artemisia, his widow, erected a most stately monument, esteemed one of the wonders of the world, and called it, from his name, mausoleum.

St. MAWES, a port and borough town of Cornwall: situated twenty miles north of the Lizard. It sends two members to parliament.

MAXILLA, the jaws, or those parts of an animal in which the teeth are set.

The jaws are shorter in the human frame than in that of any other animal, in proportion to the size of the body; and this is a circumstance that adds greatly to the beauty of the face. The upper jaw is composed of thirteen bones, twelve of which are in pairs: these are, 1. the lacrymal; 2. the nasal; 3. the jugal; 4. the maxillar; 5. the spongiosum inferius; 6. the palatine: the thirteenth is an odd bone, and is called the vomer.

These several bones of the upper maxilla are united to one another by a kind of juncture, which appears equal and even, and is called by anatomists *junctura per harmoniam*.

The maxilla inferior, or lower jaw, is that moveable bone of the head which contains the lower series of teeth; this is composed of two bones which unite in the middle of the chin, by the intervention of a cartilage, which hardens as the child grows, and at length becoming bony, joins the two bones into a continued one, resembling the greek ψ . It consists of two tables, between which there is a spongy substance, which in children is medullary. The fore part is shallow, and just sufficient to contain the sockets of sixteen teeth. It has two processes, the coronoid and condyloides; four foramina

or holes for the passage of blood-vessels and nerves, and six pairs of muscles, of which two are depressors, and four elevators; the depressors are called the platysma myoides, and the biventer; and the four pair of elevators are, the crotaphites, the masseters, and the internal and external pterygoidæi, which see under their several names. There is also the maxillary gland, situated on the inside under the lower jaw-bone. See the article **GLAND**.

MAXIM, an established proposition or principle, in which sense it denotes much the same with axiom. See the article **AXIOM**.

Maxims are a kind of propositions, which have passed for principles of science, and which, being self-evident, have been by some supposed innate.

MAXIMUM, in mathematics, denotes the greatest quantity attainable in any given case.

If a quantity conceived to be generated by motion, increases, or decreases, till it arrives at a certain magnitude or position, and then, on the contrary, grows lesser or greater, and it be required to determine the said magnitude or position, the question is called a problem de maximis et minimis.

Thus, let a point m move uniformly in a right line, from A towards B, and let another point n move after it, with a velocity either increasing, or decreasing, but so that it may, at a certain position, D, become equal to that of the former point m , moving uniformly.

This being premised, let the motion of n be first considered as an increasing one; in which case the distance of n



behind m will continually increase, till the two points arrive at the cotemporary positions C and D; but afterwards it will again decrease; for the motion of n , till then, being slower than at D, it is also slower than that of the preceding point m (by the hypothesis;) but becoming quicker afterwards, than that of m , the distance $m n$ (as has been already said) will again decrease: and therefore is a maximum, or the greatest of all, when the celerities of the two points are equal to each other.

But if n arrives at D with a decreasing celerity; then its motion being first swifter, and afterwards slower, than that of m , the distance mn will first decrease and then increase; and therefore is a minimum, or the least of all, in the forementioned circumstance. Since then the distance mn is a maximum, or a minimum, when the velocities of m and n are equal, or when that distance increases as fast through the motion of m , as it decreases by that of n , its fluxion at that instant is evidently equal to nothing. Therefore, as the motion of the points m and n may be conceived such that their distance mn may express the measure of any variable quantity whatever, it follows, that the fluxion of any variable quantity whatever, when a maximum or a minimum, is equal to nothing.

The rule therefore to determine any flowing quantity in an equation proposed, to an extreme value, is, having put the equation into fluxions, let the fluxion of that quantity (whose extreme value is sought) be supposed equal to nothing; by which means all those members of the equation in which it is found, will vanish, and the remaining ones will give the determination of the maximum or minimum required.

Prob. I. To divide a given right line into two such parts, that their product, or rectangle, may be the greatest possible. This is the case, when the line is bisected, or divided into equal parts, as has been shewn under the article FLUXION.

In any mechanical engine the proportion of the power to the weight, when they ballance each other, is found by supposing the engine to move, and reducing their velocities to the respective directions in which they act; for the inverse ratio of those velocities is that of the power to the weight according to the general principle of mechanics. But it is of use to determine likewise the proportion they ought to bear to each other, that when the power prevails, and the engine is in motion, it may produce the greatest effect in a given time. When the power prevails, the weight moves at first with an accelerated motion; and when the velocity of the power is invariable, its action upon the weight decreases, while the velocity of the weight increases.

Thus the action of a stream of water or

air upon a wheel, is to be estimated from the excess of the velocity of the fluid above the velocity of the part of the engine which it strikes, or from their relative velocity only. The motion of the engine ceases to be accelerated when this relative velocity is so far diminished, that the action of the power becomes equal to the resistance of the engine arising from the gravity of the matter that is elevated by it, and from friction; for when these ballance each other, the engine proceeds with the uniform motion it has acquired.

Prob. II. Let a denote the velocity of the stream, u the velocity of the part of the engine which it strikes when the motion of the machine is uniform, and $a-u$ will represent their relative velocity. Let A represent the weight which would ballance the force of the stream when its velocity is a , and p the weight which would ballance the force of the same stream if its velocity was only $a-u$; Then $p : A :: a-u^2 : a^2$, or $p = A \times \frac{a-u^2}{a^2}$, and p shall represent the action

of the stream upon the wheel. If we abstract from friction, and have regard to the quantity of the weight only, let it be equal to qA (or be to A as q to 1) and because the motion of the machine is supposed uniform, $p = q \times A = \frac{A \times a-u^2}{a^2}$,

or $q = \frac{a-u^2}{a^2}$. The momentum of this

weight is $qA \times u = \frac{Au \times a-u^2}{a^2}$; which

is a maximum when the fluxion of $\frac{u \times a-u^2}{a^2}$ vanishes, that is, when $u \times$

$a-u^2-2uu \times a-u=0$, or $a-3u=0$.

Therefore, in this case, the machine will have the greatest effect if $u = \frac{a}{3}$, or

the weight $qA = \frac{A \times a-u^2}{a^2} = \frac{4A}{9}$.

That is, if the weight that is raised by the engine be less than the weight which would ballance the power in the proportion of 4 to 9; and the momentum of the weight is $\frac{4Aa}{27}$

Prob. III. Suppose that the given weight

P

P (plate CLXXI. fig. 3. n° 1.) descending by its gravity in the vertical line, raises a given weight W by the cord PMW (that passes over the pulley M) along the inclined plane BD, the height of which BA is given; and let the position of the plane BD be required, along which W will be raised in the least time from the horizontal line AD to B.

Let $AB = a$, $BD = x$, $t =$ time in which W describes DB; then the force which accelerates the motion of W is $P - \frac{aW}{x}$,

t is as $\frac{x}{P - \frac{aW}{x}}$, and if we suppose the fluxion of this quantity to vanish, we

shall find $x = \frac{2aW}{P}$ or $P = \frac{2aW}{x}$; con-

sequently the plane BD required is that upon which a weight equal to $2W$ would be sustained by P; or if BC be the plane upon which W would sustain P, then $BD = 2BC$. But if the position of the plane BD be given, and W being supposed variable, it be required to find the ratio of W to P, when the greatest momentum is produced in W along the given plane BD; in this case, W ought to be to P as BD to $BA + \sqrt{BD + BA} + \sqrt{BA}$.

Questions of this kind may be likewise demonstrated from the common elementary geometry of which the following may serve as an example.

Prob. IV. Let a fluid, moving with the velocity and direction AC. (*ibid.* n° 2.) strike the plane CE, and suppose that this plane moves parallel to itself in the direction CB, perpendicular to CA, or that it cannot move in any other direction; then let it be required to find the most advantageous position of the plane CE, that it may receive the greatest impulse from the action of the fluid. Let AP be perpendicular to CE in P, draw AK parallel to CB, and let PK be perpendicular upon it in K; and AK will measure the force with which any particle of the fluid impels the plane EC, in the direction CB. For the force of any such particle being represented by AC, let this force be resolved into AQ parallel to EC, and AP perpendicular to it; and it is manifest, that the latter AP only has any effect upon the plane CE. Let this force AP be resolved into the force AL perpendicular to CB, and

the force AK parallel to it; then it is manifest, that the former, AL, has no effect in promoting the motion of the plane in the direction CB; so that the latter, AK, only, measures the effort by which the particle promotes the motion of the plane CE, in the direction CB. Let EM and EN be perpendicular to CA and CB, in M and N; and the number of particles, moving with directions parallel to AC, incident upon the plane CE, will be as EM. Therefore the effort of the fluid upon CE, being as the force of each particle, and the number of particles together, it will be as $AK \times EM$; or, because AK is to AP ($= EM$) as EN to CE, as $EM^2 \times EN$ to CE ; so that CE being

given, the problem is reduced to this, to find when $EM^2 \times EN$ is the greatest possible, or a maximum. But because the sum of EM^2 and of $EN^2 (= CM^2)$ is given, being always equal to CE^2 , it follows that $EN^2 \times EM^4$ is greatest when $EN^2 = \frac{1}{3}CE^2$; for when the sum of two quantities AC and CB (*ibid.* n° 3.) was given, $AC \times CB^2$ is greatest when $AC = \frac{1}{3}AB$, as will be very evident if a semicircle is described upon AD. But when $EN^2 \times EM^4$ is greatest, its square root $EN \times EM^2$ is of necessity at the same time greatest. Therefore the action of the fluid upon the plane CE in the direction CB is greatest when $EN^2 = \frac{1}{3}CE^2$, and consequently $EM^2 = \frac{2}{3}CE^2$; That is, when EM the sine of the angle ACE in which the stream strikes the plane is to the radius, as $\sqrt{2}$ to $\sqrt{3}$; in which case it easily appears from the trigonometrical tables, that this angle is of $54^\circ 44'$.

Several useful problems in mechanics may be resolved by what we have just now shewn. If we represent the velocity of the wind by AC, (n° 2.) a section of the sail of a windmill perpendicular to its length by CE, as it follows from the nature of the engine, that its axis ought to be turned directly to the wind, and the sail can only move in a direction perpendicular to the axis, it appears, that when the motion begins, the wind will have the greatest effect to produce this motion, when the angle ACE in which the wind strikes the sail is of $54^\circ 44'$. In the same manner, if CB represent the

the

the direction of the motion of a ship, or the position of her keel, abstracting from her lee-way, and A C be the direction of the wind, perpendicular to her way, then the most advantageous position of the sail C E, to promote her motion in the direction C B, is when the angle A C E, in which the wind strikes the sail, is of $54^{\circ} 44'$. The best position of the rudder, where it may have the greatest effect in turning round the ship, is determined in like manner.

MAY, *maius*, the fifth month of the year, consisting of thirty-one days. See the article MONTH and YEAR.

In this month the sun enters the sign gemini. See the article GEMINI.

MAY is also the name of a little island, in the mouth of the frith of Forth, near the coast of Fife in Scotland.

MAYENNE, a city of France, in the province of Orleanois: west long. $45'$, and north lat. $48^{\circ} 20'$.

MAYHEM, or MAIM, in law. See the article MAIM.

MAYL, among falconers, signifies to pinion a hawk's wings.

MAYO, one of the Cape Verde islands: west long. 23° , north lat. 15° .

MAYO is also a county of Ireland, in the province of Connaught, having Slego on the north, and Roscommon on the south.

MAYOR, the chief magistrate of a city or town, chosen annually out of the aldermen.

If any person intrudes into the office of mayor, a quo warranto lies against him, upon which he shall not only be ousted, but fined. And no mayor, or person holding an annual office in a corporation for one year, is to be elected into the same office for the next; in this case, persons obstructing the choice of a successor, are subject to 100 l. penalty. Where the mayor of a corporation is not chosen on the day appointed by charter, the next officer in place shall the day after hold a court and elect one; and if there be a default or omission that way, the electors may be compelled to choose a mayor, by virtue of a writ of mandamus out of the king's bench. Mayors, or other magistrates of a corporation, who shall voluntarily absent themselves on the day of election, are liable to be imprisoned and disqualified from holding any office in the corporation.

MAZAGAN, a port-town of Morecco: west long. 10° , north lat. 33° .

MAZARA, the capital of the province of the same name in Sicily, situated on the south-west coast: east long. $12^{\circ} 30'$, north lat. $37^{\circ} 42'$.

MAZORAH, or MASSORA. See the article MASSORA.

MEACO, a city of the island of Nippon, or Japan: east long. 135° , north lat. $35^{\circ} 20'$.

MEAD, an agreeable liquor made of honey and water. See HONEY.

There are many receipts for making mead, of which the following is one of the best. Take four gallons of water, and as much honey as will make it bear an egg; add to this, the rind of three lemons; boil it, and scum it well as it rises. Then take it off the fire, and add the three lemons cut in pieces; pour it into a clean tub or open vessel, and let it work for three days: then scum it well, and pour off the clear part into a cask, and let it stand open till it ceases to make a hissing noise; then stop it up close, and in three months time it will be fine and fit for bottling.

If you would give it a finer flavour, take cloves, mace, and nutmeg, of each four drams; beat them small, tie the powder in a piece of cloth, and put it into the cask.

MEADIA, a town of Hungary, in the Bannat of Tameswaer, fifteen miles east of Belgrade.

MEADOW, in its general signification, means pasture, or grass-land, annually mown for hay; but it is more particularly applied to lands that are so low as to be too moist for cattle to graze upon them in winter, without spoiling the sward. Too much, or too little water is almost equally prejudicial to meadows, but the best land for meadows is a rich soil, that has a moist bottom, especially where a small brook may be brought over it, and where there is such a descent that the water will not lodge: these are better than those by great rivers, where the crops are often lost. Those that may be over-flowed at pleasure, are called water-meadows; these should never be over-flowed till the end of March, except once or twice in winter, when there are such floods as bring down a great deal of soil from the upper lands, and if the season should prove dry,

dry, it will be of great service to the grass, if the meadows are overflowed again; but then the cattle should not be turned in till the sward is dry enough to bear their weight. Miller recommends the weeding of meadows in April and October, with a spaddle, and rolling them with a heavy roller in spring and autumn. See the article PASTURE.

MEAN, in general, denotes the middle between two extremes: thus we say, mean distance, mean proportion, &c. See the articles DISTANCE, PROPORTION, &c.

MEAN ANOMALY, in astronomy. See the article ANOMALY.

MEAN { CONJUNCTION, } in astronomy,
{ OPPOSITION, }
is when the mean place of the sun is in { conjunction, } with the mean place of { opposition, } the moon in the ecliptic. See the articles CONJUNCTION and OPPOSITION.

MEAN *distance of a planet from the sun*, in astronomy, is the right line drawn from the sun, to the extremity of the conjugate axis of the ellipsis the planet moves in; and this is equal to the semitransverse axis, and is so called, because it is a mean between the planet's greatest and least distance from the sun. See the article DISTANCE.

MEAN MOTION, in astronomy, that whereby a planet is supposed to move equally in its orbit, and is always proportional to the time. See the article MOTION.

MEASLES, in medicine, a cutaneous disease, attended with a fever, in which there is an appearance of eruptions that do not tend to a suppuration. The measles begin with chilliness and shivering, and heat and cold succeed by turns. The next day the fever comes on, with great sickness, thirst, and loss of appetite; the tongue is white, but not dry; there is a little cough, a heaviness of the head and eyes, and a continual sleepiness; then follows a sneezing, and swelling of the eye-lids, and a serous humour oft distils from the nose and eyes, which are certain signs that the eruption is at hand. In the face, the spots are small, but on the breast broad and red. The patient vomits, but oftner has a looseness with greenish stools. These symptoms continue and increase till the fourth, and sometimes the fifth day, at which time the spots, which are like

flea-bites, increase in number and magnitude, but rise little above the skin. The symptoms do not immediately vanish after the eruption, as in the small-pox, except the vomiting. The cough and fever increase, with difficulty of breathing. About the sixth day, the skin of the face and forehead begins to grow rough, and the cuticle breaking, the pustules die away; and on the eighth day the spots disappear in the face, and are scarce visible any where else; on the ninth, they quite vanish, and fine, thin, light scales, fall from the skin.

The measles are in general not dangerous, unless from an insalubrious epidemical constitution of the year, which, sometimes renders them malignant; which may be known by a sudden loss of strength, coldness of the extreme parts, great restlessness, and a delirium. Those who die of the measles, are generally suffocated on the ninth day. Some have a looseness, which continues several weeks, and brings on a mortal tabes. Some have a slow fever, with an atrophy and a swelling of the abdomen, which are fatal; and when a cough and hoarseness remain after the disease, a consumption will follow without speedy assistance.

If children are suspected to abound with crudities in the intestines, it will be proper to evacuate with half a grain of tartar emetic, and syrup of succory with rhubarb. When there are worms, anthelmintics should be given. In adults abounding with blood, phlebotomy is necessary on the first days; and as soon as the eruption is ended a gentle cathartic is proper: in a cough, nothing is better than oil of almonds fresh drawn, mixt with syrup of capillaire; half a spoonful of which should be often given in water-gruel. The patient should keep his bed for two days after the first eruption, and take absorbent and diaphoretic powders, to which half a grain of saffron may be added; these should be taken every night from the first onset of the disease, till the patient recover, encreasing or diminishing the dose according to his age. If after the measles disappear, they should be followed by a difficulty of breathing, a fever, and other symptoms of an inflammation of the lungs, let blood be taken freely from the arm, once, twice, or three times, as occasion shall require, leaving

leaving a due space between each bleeding, and give oil of sweet almonds, and about twelve days from the invasion let the patient be purged. The diet ought to be the same as in the small-pox, taking particular care that the body be kept lax rather than bound up, through the course of the distemper. See POX.

MEASURE, *mensura*, in geometry, denotes any quantity assumed as one, or unity, to which the ratio of other homogeneous or similar quantities is expressed. This definition is somewhat more agreeable to practice than that of Euclid, who defines measure, a quantity which being repeated any number of times becomes equal to another. This latter definition answers only to the idea of an arithmetical measure, or quota-part.

MEASURE of an angle, is an arch described from the vertex in any place between its legs.

Hence angles are distinguished by the ratio of the arches, described from the vertex between the legs to the peripheries. Angles then are distinguished by those arches; and the arches are distinguished by their ratio to the periphery: thus an angle is said to be so many degrees as there are in the said arch. See the article **ANGLE**.

MEASURE of a figure, or plane surface, is a square whose side is one inch, foot, yard, or some other determinate length. Among geometers, it is usually a rod called a square rod, divided into ten square feet, and the square feet into ten square digits. Hence square measures. See the articles **TRIANGLE**, **SQUARE**, **PARALLELOGRAM**, **SURVEYING**, &c.

MEASURE of a line, any right line taken at pleasure, and considered as unity. The modern geometers use a decempeda, or perch, divided into ten equal parts, called feet; the feet they subdivide into ten digits, and the digit into ten lines, &c.

MEASURE of the mass, or quantity of matter, in mechanics, is its weight; it being apparent that all the matter which coheres and moves with a body, gravitates with it, and it being found by experiment, that the gravities of homogeneous bodies are in proportion to their bulks; hence, while the mass continues

the same, the weight will be the same, whatever figure it put on: by which is meant its absolute weight, for as to its specific, that varies as the quantity of the surface varies. See the articles **GRAVITY** and **MOMENT**.

MEASURE of a number, in arithmetic, such a number as divides another without leaving any fraction: thus 9 is a measure of 27.

MEASURE of a solid, is a cube whose side is one inch, foot, yard, or any other determinate length. In geometry, it is a cubic perch, divided into cubic feet, digits, &c. hence cubic measures, or measures of capacity. See the articles **SPHERE**, **CUBE**, &c.

MEASURE of velocity, in mechanics, the space passed over by a moving body in a given time. To measure a velocity therefore, the space must be divided into as many equal parts as the time is conceived to be divided into; the quantity of space answering to such an article of time is the measure of the velocity. See the article **VELOCITY**.

MEASURE, in a legal and commercial sense, denotes a certain quantity or proportion of any thing bought, sold, valued, or the like. Measures are then various, according to the various kinds and dimensions of the things measured. Hence arise lineal or longitudinal measures, for lines or lengths; square measures, for areas or superficies; and solid or cubic measures, for bodies and their capacities. All which again are very different in different countries, and in different ages, and even many of them for different commodities. Whence arise other divisions of antient and modern measures, domestic and foreign ones, dry measures, liquid measures, &c.

Long MEASURES, or **MEASURES of application**. The english standard long measure for commerce, or that whereby the quantities of things are ordinarily estimated in the way of trade, is the yard, containing three english feet. Its divisions are the foot, span, palm, inch, and barley-corn; its multiples the pace, fathom, pole, furlong, and mile. The proportions these severally bear to each other, are expressed in the following table.

English MEASURES of Length.

| | | | | | | | | | |
|--------------|-------|-------|----------------|-----------------|----------------|----------------|-----------------|----------------|-------------|
| Barley-corns | | | | | | | | | |
| 3 | Inch | | | | | | | | |
| 9 | 3 | Palm | | | | | | | |
| 27 | 9 | 3 | Span | | | | | | |
| 36 | 12 | 4 | $1\frac{1}{3}$ | Foot | | | | | |
| 54 | 18 | 6 | 2 | $1\frac{1}{2}$ | Cubit | | | | |
| 108 | 36 | 12 | 4 | 3 | 2 | Yard | | | |
| 180 | 60 | 20 | $6\frac{2}{3}$ | 5 | $3\frac{1}{3}$ | $1\frac{2}{3}$ | Pace | | |
| 216 | 72 | 24 | 8 | 6 | 4 | 2 | $1\frac{1}{5}$ | Fathom | |
| 594 | 198 | 66 | 22 | $16\frac{1}{2}$ | 11 | $5\frac{1}{2}$ | $3\frac{3}{10}$ | $2\frac{3}{4}$ | Pole |
| 23760 | 7920 | 2640 | 880 | 660 | 440 | 220 | 132 | 110 | 40 Furlong |
| 190080 | 63360 | 21120 | 7040 | 5280 | 3520 | 1760 | 1056 | 880 | 320 8 Mile. |

Scripture-MEASURES of Length reduced to English.

| | | | | | | | Eng. feet. | inch. Dec. |
|-------|------|------|-------|----------------|-----------------|------------------------------|---------------|---------------|
| Digit | | | | | | | 0 | 0.912 |
| 4 | Palm | | | | | | 0 | 3.648 |
| 12 | 3 | Span | | | | | 0 | 10.944 |
| 24 | 6 | 2 | Cubit | | | | 1 | 9.888 |
| 96 | 24 | 8 | 4 | Fathom | | | 7 | 3.552 |
| 144 | 36 | 12 | 6 | $1\frac{1}{2}$ | Ezekiel's reed | | 10 | 11.328 |
| 192 | 48 | 16 | 8 | 2 | $1\frac{1}{3}$ | Arabian pole | 14 | 7.104 |
| 1920 | 480 | 160 | 80 | 20 | $13\frac{1}{3}$ | Schoenus, or measuring line. | 145 | 11.04 |

The Longer Scripture-MEASURES.

| | | | | | | English miles paces feet. |
|-------|---------|--------------------|--------------|----------|-----------------|------------------------------|
| Cubit | | | | | | 0 0 1.824 |
| 400 | Stadium | | | | | 0 145 4.6 |
| 2000 | 5 | Sab. day's journey | | | | 0 729 3.000 |
| 4000 | 10 | 2 | Eastern mile | | | 1 403 1.000 |
| 12000 | 30 | 6 | 3 | Parasang | | 4 153 3.000 |
| 96000 | 240 | 48 | 24 | 8 | a day's journey | 33 172 4.000 |

Grecian MEASURES of Length reduced to English.

| | | | | | | | | | | English | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | Paces. | feet. dec. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dactylus, digit | | | | | | | | | | — | — | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Doron, dochme | | | | | | | | | | — | — | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 2 $\frac{1}{2}$ | Lichas | 1 $\frac{1}{10}$ | Orthodoron | 1 $\frac{1}{11}$ | Spithame | 1 $\frac{1}{3}$ | Foot | 1 $\frac{1}{8}$ | Cubit | 1 $\frac{1}{9}$ | Pygon | 1 $\frac{1}{5}$ | Cubit larger | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | —</ |

A Table of the MEASURES of Length of the principal Places in Europe, compared with the English Yard.

| | Eng. yard. |
|---|-------------------|
| 100 Aunes or ells of England equal to | 125 |
| 100 of Holland or Amsterdam | 75 |
| 100 of Brabant or Antwerp | 76 |
| 100 of France | 128 $\frac{1}{4}$ |
| 100 of Hamburgh, Francfort, &c. | 62 $\frac{1}{2}$ |
| 100 of Breslau | 60 |
| 100 of Dantzick | 66 $\frac{3}{4}$ |
| 100 of Bergen and Dronheim | 68 $\frac{1}{4}$ |
| 100 of Sweden or Stockholm | 65 $\frac{3}{4}$ |
| 100 of St. Gall, for linens | 87 $\frac{1}{2}$ |
| 100 of ditto, cloths | 67 |
| 100 of Geneva | 124 $\frac{3}{4}$ |
| 100 Canes of Marseilles and Montpellier | 214 $\frac{1}{2}$ |
| 100 of Toulouse and high Languedoc | 200 |
| 100 of Genoa, of 9 palms | 245 $\frac{1}{4}$ |
| 100 of Rome | 227 $\frac{1}{4}$ |
| 100 Varas of Spain | 93 $\frac{3}{4}$ |
| 100 of Portugal | 123 |
| 100 Cavidos of Portugal | 75 |
| 102 Braffes of Venice | 73 $\frac{1}{2}$ |
| 100 of Bergamo, &c. | 71 $\frac{1}{4}$ |
| 100 of Florence and Leghorn | 64 |
| 100 of Milan | 58 $\frac{1}{2}$ |

N. B. The aunes or ells of Amsterdam, Haerlem, Leyden, the Higue, Rotterdam, and other cities of Holland, as also that of Nuremberg. being all equal, are comprehended under that of Amsterdam; as those of Osnabrug are under those of France; and those of Bern and Basil are equal to those of Hamburg, Francfort, and Leipzig.

For the subdivisions and multiples of each of these measures of length. See the article AUNE, &c.

For the proportion of the feet of the principal nations of Europe, compared with the english foot, see the article FOOT.

Square, or Superficial MEASURES. English square or superficial measures, are raised from the yard of 36 inches multiplied into itself, and thus producing 1296 square inches in the square yard: the divisions of this are square feet and inches; and the multiples, poles, roods, and acres, as in the following table.

English Square-MEASURES.

| Inches | Feet | Yards | Paces | Poles | Rood | acre |
|---------|-------------------|------------------|--------|-------|------|------|
| 144 | 9 | 2 $\frac{7}{8}$ | 10.89 | 40 | 160 | 4 |
| 1296 | 25 | 30 $\frac{1}{4}$ | 435.6 | 160 | 4 | |
| 3600 | 272 $\frac{1}{4}$ | 1210 | 1743.6 | 160 | 4 | |
| 10204 | 10890 | 4840 | | | | |
| 1568160 | 10890 | 1210 | 435.6 | 40 | 160 | 4 |
| 6272640 | 43560 | 4840 | 1743.6 | 160 | 4 | acre |

Grecian square-measures were the plethron, or acre, by some said to contain 1444, by others 10000 square feet; and aoura, the half of the plethron; The aoura of the Egyptians was the square 100 cubits.

Roman Square-MEASURE reduced to English.

The integer was the jugerum or acre, which the Romans divided like the libra or as: thus, the jugerum contained

| | square feet. | scruples. | roods. | Eng. poles. | Square feet. |
|----------|--------------|-----------|--------|-------------|--------------|
| As | 28800 | 288 | 2 | 18 | 250.05 |
| Deunx | 26400 | 264 | 2 | 10 | 183.85 |
| Dextans | 24000 | 240 | 2 | 2 | 117.64 |
| Dodrans | 21600 | 216 | 1 | 34 | 51.42 |
| Bes | 19200 | 192 | 1 | 25 | 257.46 |
| Septunx | 16800 | 168 | 1 | 17 | 191.25 |
| S mis | 14400 | 144 | 1 | 9 | 125.03 |
| Quincunx | 12000 | 120 | 1 | 1 | 58.82 |
| Triens | 9600 | 96 | 0 | 32 | 264.85 |
| Quadrans | 7200 | 72 | 0 | 24 | 198.64 |
| Sextans | 4800 | 48 | 0 | 16 | 132.43 |
| Uncia | 2400 | 24 | 0 | 8 | 66.21 |

Note, Actus major was 14400 square feet, equal to a semis; clima, 3600 square feet, equal to fescuncia; and actus minimus equal to a sextans.

Cubical MEASURES, or Measures of capacity for liquids.

The english measures were originally raised from troy-weight; it being enacted by several statutes that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, should weigh a gallon of wine measure, the divisions and multiples whereof were to form the other measures; at the same time it was also ordered, that there should be but one liquid measure in the kingdom: yet custom has prevailed, and there having been

into.

introduced a new weight, viz. the avoirdupois, we have now a second standard-gallon adjusted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter standard are raised two several measures, the one for ale, the other for beer.

The sealed gallon at Guildhall, which is the standard for wines, spirits, oils, &c. is supposed to contain 231 cubic inches; and on this supposition the other measures raised therefrom, will contain as in the table underneath: yet by actual experiment, made in 1688, before the lord-

mayor and the commissioners of excise, this gallon was found to contain only 224 cubic inches: it was however agreed to continue the common supposed contents of 231 cubic inches; so that all computations stand on their old footing. Hence as 12 is to 231, so is $14\frac{12}{20}$ to $281\frac{1}{2}$ the cubic inches in the ale-gallon: but in effect the ale-quart contains $70\frac{1}{2}$ cubic inches, on which principle the ale and beer-gallon will be 282 cubic inches. The several divisions and multiples of these measures, and their proportions, are exhibited in the following tables.

English MEASURE of Capacity for Liquids.

Wine-Measure.

| Solid inches | | | | | | | | | |
|--------------------|------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|------|
| 28 $\frac{7}{8}$ | Pint | | | | | | | | |
| 231 | 8 | Gallon | | | | | | | |
| 4158 | 144 | 18 | Rundlet | | | | | | |
| 7276 $\frac{1}{2}$ | 252 | 31 $\frac{1}{2}$ | 1 $\frac{3}{4}$ | Barrel | | | | | |
| 9702 | 336 | 42 | 2 $\frac{1}{3}$ | 1 $\frac{1}{3}$ | Tierce | | | | |
| 14553 | 504 | 63 | 3 $\frac{1}{2}$ | 2 | 1 $\frac{1}{2}$ | Hogshead | | | |
| 19279 | 672 | 84 | 4 $\frac{2}{3}$ | 2 $\frac{2}{3}$ | 2 | 1 $\frac{1}{3}$ | Punchion | | |
| 29106 | 1008 | 126 | 7 | 4 | 3 | 2 | 1 $\frac{1}{2}$ | Butt | |
| 58212 | 2016 | 252 | 14 | 8 | 6 | 4 | 3 | 2 | Tun. |

Ale-Measure.

| Pints | | | | |
|-------|--------|--------|-----------|-------------|
| 8 | Gallon | | | |
| 64 | 8 | Firkin | | |
| 128 | 16 | 2 | Kilderkin | |
| 256 | 32 | 4 | 2 | Barrel |
| 512 | 64 | 8 | 4 | 2 Hogshead. |

Beer-Measure.

| Pints | | | | |
|-------|--------|--------|-----------|------------|
| 8 | Gallon | | | |
| 72 | 9 | Firkin | | |
| 144 | 18 | 2 | Kilderkin | |
| 288 | 36 | 4 | 2 | Barrel |
| 576 | 72 | 8 | 4 | 2 Hogshead |

Jewish MEASURES of Capacity for Liquids, reduced to English Wine-measure.

| | | | | | | | | | | Gall. | pints. | Solid inches. |
|---------------------------------------|--|--|--|--|--|--|--|--|--|-------|-----------------|---------------|
| Caph | | | | | | | | | | 0 | 0 $\frac{5}{8}$ | 0.177 |
| 1 $\frac{1}{3}$ Log | | | | | | | | | | 0 | 0 $\frac{5}{6}$ | 0.211 |
| 5 $\frac{1}{3}$ 4 Cab | | | | | | | | | | 0 | 3 $\frac{1}{3}$ | 0.844 |
| 16 12 3 Hin | | | | | | | | | | 1 | 2 | 2.533 |
| 32 24 6 2 Seah | | | | | | | | | | 2 | 4 | 5.067 |
| 96 72 18 6 3 Bath, or Epha | | | | | | | | | | 7 | 4 | 15.2 |
| 960 720 180 60 30 10 Coron, or Chomer | | | | | | | | | | 75 | 5 | 7.625 |

Attic MEASURES of Capacity for Liquids, reduced to English Wine-measure.

| | | | | | | | | | | Gall. | Pints. | fol. inch | Dec. |
|--|---|---|---|---|---|---|---|---|---|-------|-----------------|-----------------------|------|
| Cochliarion | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{120}$ | 0.0356 $\frac{5}{12}$ | |
| 2 Cheme | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{60}$ | 0.0712 $\frac{5}{6}$ | |
| 2 $\frac{1}{2}$ Mystron | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{48}$ | 0.089 $\frac{11}{18}$ | |
| 5 2 Conche | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{24}$ | 0.178 $\frac{11}{24}$ | |
| 10 5 4 2 Cyathos | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{12}$ | 0.356 $\frac{11}{12}$ | |
| 15 7 $\frac{1}{2}$ 6 3 1 $\frac{1}{2}$ Oxybaphon | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{8}$ | 0.535 $\frac{3}{8}$ | |
| 60 30 24 12 6 4 Cotyle | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{2}$ | 2.141 $\frac{1}{2}$ | |
| 120 60 48 24 12 8 2 Xestes | — | — | — | — | — | — | — | — | — | 0 | 1 | 4.283 | |
| 720 360 288 144 72 48 12 6 Chous | — | — | — | — | — | — | — | — | — | 0 | 6 | 25.698 | |
| 8640 4320 3456 1728 864 576 144 72 12 Metretres | — | — | — | — | — | — | — | — | — | 10 | 2 | 19.629 | |

Roman MEASURES of Capacity for liquids, reduced to English Wine-measure.

| | | | | | | | | | | Gall. | Pints. | fol. inch | Dec. |
|---|---|---|---|---|---|---|---|---|---|-------|-----------------|----------------------|------|
| Ligula | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{48}$ | 0.117 $\frac{5}{12}$ | |
| 4 Cyathus | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{12}$ | 0.469 $\frac{2}{3}$ | |
| 6 1 $\frac{1}{2}$ Acetabulum | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{8}$ | 0.704 $\frac{1}{2}$ | |
| 12 3 2 Quartarius | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{4}$ | 1.409 | |
| 24 6 4 2 Hemina | — | — | — | — | — | — | — | — | — | 0 | $\frac{1}{2}$ | 2.818 | |
| 48 12 8 4 2 Sextarius | — | — | — | — | — | — | — | — | — | 0 | 1 | 5.636 | |
| 288 72 48 24 12 6 Congius | — | — | — | — | — | — | — | — | — | 0 | 7 | 4.942 | |
| 1152 288 192 96 48 24 4 Urna | — | — | — | — | — | — | — | — | — | 3 | 4 $\frac{1}{2}$ | 5.33 | |
| 2304 576 384 192 96 48 8 2 Amphora | — | — | — | — | — | — | — | — | — | 7 | 1 | 10.66 | |
| 46080 11520 7680 3840 1920 960 160 40 20 Culeus | — | — | — | — | — | — | — | — | — | 143 | 3 | 11.095 | |

In the modern liquid measures of foreign nations, it is to be observed, that their several vessels for wine, vinegar, &c. have also various denominations, according to their different sizes, and the places wherein they are used. The woeders of Germany, for holding rhenish and moselle-wines, are different in their gauges; some containing 14 aumes of amsterdam-measure, and others more or less. The aume is reckoned at Amsterdam for 8 steckans, or 20 verges, or for $\frac{1}{6}$ of a ton of 2 pipes; or 4 barrels of France or Bourdeaux, which $\frac{1}{6}$ at this latter place is called tiercon, because 3 of them make a pipe or 2 barrels, and 6 the said ton. The steckan is 16 mingles, or 32 pints; and the verge is, in respect of the said rhenish and-moselle, and some other sorts of wine, of 6 mingles; but in measuring brandy it consists of 6 $\frac{1}{2}$ mingles. The aume is divided into 4 anckers, and the

ancker into 2 steckans, or 32 mingles. The ancker is taken sometimes for $\frac{1}{24}$ of a ton, or 4 barrels, on which footing the bourdeaux-barrel ought to contain at Amsterdam (when the cask is made according to the just gauge) 12 $\frac{1}{2}$ steckans, or 200 mingles, wine and lees; or 12 steckans, or 192 mingles racked wine; so that the bourdeaux-ton of wine contains 50 steckans, or 800 mingles, wine and lees; and 48 steckans, or 768 mingles of pure wine. The barrels or poinçons of Nantes and other places on the river Loire, contain only 12 steckans amsterdam measure. The wine-ton of Rochelle, Cognac, Charente, and the Isle of Rhé, differs very little from the ton of Bourdeaux, and consequently from the barrels and pipes. A ton of wine of Chalosse, Bayonne, and the neighbouring places, is reckoned 60 steckans, and the barrel 15, amsterdam measure.

The



The muid of Paris contains 150 quarts, or 300 pints, wine and lee; or 280 pints clear wine; of which muids 3 make a ton, and the fractions are

| | | |
|-----------------|--------------|----------------|
| The muid | } containing | 36 setiers |
| The setier | | 4 quarts |
| The quart | | 2 pints |
| The pint | | 2 chopins |
| The chopin | | 2 demi-setiers |
| The demi setier | | 2 poissons. |

The muid is also composed of pipes, or poinçons, quarteaux, queves, and demi-queves: these poinçons of Paris and Orleans contain about 15 steckans amsterdam-measure, and ought to weigh with the cask 666 lb. a little more or less. In Provence they reckon by milleroles, and the millerole of Toulon contains 66 paris-pints, or 100 pints of Amsterdam, nearly; and the paris-pint is nearly equal to the english wine-quart.

At Rochelle, Cognac, the Isle of Rhé, and the country of Aunis
 At Nants, and several places of Bretagne and Anjou
 At Bourdeaux, and different parts of Guienne
 At Amsterdam, and other cities of Holland
 At Hamburgh and Lubeck
 At Embden

27 Veertels
 29 Veertels
 32 Verges
 30 Veertels
 30 Verges
 27 Verges

per barrel.

In Provence and Languedoc, brandy is sold by the quintal, the casks included; and at Bruges, in Flanders, the verges are called setiers of 16 stops each, and the spirit is sold at so much per stop.

Olive-oil is also shipped in casks of various sizes, according to the custom of the places where it is embarked, and the conveniency of stowage. In England it is sold by the ton of 236 gallons; and at Amsterdam by the ton of 717 mingles, or 1434 pints. In Provence it is sold by milleroles of 66 paris-pints: from Spain and Portugal it is brought in pipes, or butts, of different gauges; at the first place it is sold by roves, whereof 40 go to the butt; and at the latter place by almoudas, whereof 26 make a pipe. Train-oil is sold in England by the ton, at Amsterdam by the barrel.

MEASURES of capacity for things dry.
 English dry or corn-measures are raised from the winchester-gallon, which contains $272\frac{1}{4}$ solid inches, and ought to hold

The butts or pipes from Cadiz, Malaga, Alicant, Benecarlo, Saloe, and Mataro, and from the Canaries, from Lisbon, Oporto, and Fayal, are very different in their gauges, though in affreightments they are all reckoned two to the ton.

Vinegar is measured in the same manner as wine; but the measures for brandies are different: these spirits from France Spain, Portugal, &c. are generally shipped in large casks called pipes, butts, and pieces, according to the places from whence they are exported, &c. In France, brandy is shipped in casks called pieces at Bourdeaux, and pipes at Rochelle, Cognac, the Isle of Rhé, and other neighbouring places, which contain some more and some less, even from 60 to 90 amsterdam-verges or veertels, according to the capacity of the vessels, and the places they come from, which being reduced into barrels, will stand as follows, viz.

of pure running water 9 pounds 13 ounces. This seems to stand on the foot of the old wine-gallon of 224 cubic inches, 12 being to $14\frac{1}{2}$ as 224 to $272\frac{1}{4}$; but by an act of parliament made in 1697 it is decreed, that a round bushel, $18\frac{1}{2}$ inches wide, and 8 deep, is a legal winchester-bushel. Now such a bushel will only hold 2150.42 cubic inches, consequently the gallon will hold 268.8 cubic inches, the divisions and multiples whereof are as in the following table:

English Dry or Corn-measure.

| Solid inches | | | |
|--------------|------|--------|---------------|
| 23.6 | Pint | | |
| 268.8 | 8 | Gallon | |
| 537.6 | 16 | 2 | Peck |
| 2150.4 | 64 | 8 | 4 Bushel |
| 17203.2 | 512 | 64 | 32 2 Quarter. |

Scripture-MEASURES of Capacity for things dry, reduced to English Corn-measure.

| | | | | | | | | Peck | Gal. | Pint. | Solid inch. | Dec. |
|---------------------------------------|---|---|---|---|---|---|---|------|------|-------|------------------|--------|
| Gachal | — | — | — | — | — | — | — | 0 | 0 | 0 | $\frac{17}{120}$ | 0.031 |
| 20 Cab | — | — | — | — | — | — | — | 0 | 0 | 2 | $\frac{5}{6}$ | 0.073 |
| 36 $1\frac{1}{5}$ Gomor | — | — | — | — | — | — | — | 0 | 0 | 5 | $\frac{1}{18}$ | 1.211 |
| 120 6 $3\frac{1}{3}$ Seah | — | — | — | — | — | — | — | 1 | 0 | 1 | | 4.036 |
| 360 18 10 3 Epha | — | — | — | — | — | — | — | 3 | 0 | 3 | | 12.107 |
| 1800 90 50 15 5 Leteah | — | — | — | — | — | — | — | 16 | 0 | 0 | | 26.500 |
| 3600 180 100 10 10 2 Chomer, or Coron | — | — | — | — | — | — | — | 32 | 0 | 1 | | 18.969 |

Attic MEASURES of Capacity for things dry, reduced to English Corn-measure.

| | | | | | | | | Peck | Gal. | Pint. | Solid inch. | Dec. |
|------------------------------------|---|---|---|---|---|---|---|------|------|-------|-------------------|---------------|
| Cochliarion | — | — | — | — | — | — | — | 0 | 0 | 0 | $6\frac{276}{20}$ | |
| 10 Cyathos | — | — | — | — | — | — | — | 0 | 0 | 0 | 2.753 | $\frac{1}{2}$ |
| 15 $1\frac{1}{2}$ Oxybaphon | — | — | — | — | — | — | — | 0 | 0 | 9 | 4.144 | $\frac{3}{4}$ |
| 60 6 4 Cotyle | — | — | — | — | — | — | — | 0 | 0 | 0 | 16.579 | |
| 120 12 8 2 Xestes | — | — | — | — | — | — | — | 0 | 0 | 0 | 33.158 | |
| 180 18 12 3 $1\frac{1}{2}$ Choenix | — | — | — | — | — | — | — | 0 | 0 | 1 | 15.795 | $\frac{3}{4}$ |
| 8640 864 576 144 72 48 Medimnos | — | — | — | — | — | — | — | 4 | 0 | 6 | 3.501 | |

Roman MEASURES of Capacity for things dry, reduced to English Corn-measure.

| | | | | | | | | Peck | Gal. | Pint. | Solid inch. | Dec. |
|-----------------------------|---|---|---|---|---|---|---|------|------|-------|----------------|------|
| Ligula | — | — | — | — | — | — | — | 0 | 0 | 0 | $\frac{1}{8}$ | 0.01 |
| 4 Cyathus | — | — | — | — | — | — | — | 0 | 0 | 0 | $\frac{1}{2}$ | 0.04 |
| 6 $1\frac{1}{2}$ Acetabulum | — | — | — | — | — | — | — | 0 | 0 | 0 | $\frac{1}{8}$ | 0.06 |
| 24 6 4 Hemina | — | — | — | — | — | — | — | 0 | 0 | 0 | $\frac{1}{2}$ | 0.24 |
| 48 12 8 2 Sextarius | — | — | — | — | — | — | — | 0 | 0 | 1 | | 0.48 |
| 384 96 64 16 8 Semimodius | — | — | — | — | — | — | — | 0 | 1 | 0 | | 3.84 |
| 768 192 128 32 16 2 Modius | — | — | — | — | — | — | — | 1 | 0 | 0 | | 7.68 |

In the several parts of Europe, salt, which is a more staple and current commodity than any other, is bought and sold by different measures, according to the several places of its dispatch; at Amsterdam it is sold by the cent of 404 measures, or scheppels, which cent is reckoned to be 7 lafts, or 14 tons, and the laft is to weigh 4000 lb. the 7 lafts making 28000 lb. called the cent of salt, which also contains 208 sacks; though some of this commodity is much heavier than others. In the cities of France, salt is sold by the muid, whose size varies according to the different places of its manufacture and dispatch. At Paris this measure is reckoned to contain 12 setiers, or 48 minots, which mi-

not is also divided into other measures. The cent of salt from Marans, Brouage, Sude, and the Isle of Rhé, contain 28 stricken muids, and each muid 24 boisseaux, which yields at Amsterdam $11\frac{1}{2}$ lafts, or 23 tons, more or less. In Copenhagen the said cent renders only $9\frac{1}{2}$ lafts, the laft being reckoned here equal to 18 tons, and 50 lafts to correspond with 52 of Coningsberg, at which place the cent produces about 10 lafts, or 40000 lb. At Riga the said cent yields the same measure as at Coningsberg, and about $6\frac{1}{4}$ lafts of Riga make the great cent of Amsterdam. The said french cent produces at Dantzick from $11\frac{1}{2}$ to 12 lafts, of which lafts from $7\frac{1}{4}$ to $7\frac{1}{2}$ make likewise the great cent

cent of Amsterdam. At Stetin in Pomerania, the french cent yielded ten lasts, making 40,000 measure and weight of the said place. In Portugal it is bought by the muid, of which four make a last, and seven the cent of Amsterdam. At Alamat and Ivica it is sold by the modin, which weighs from $27\frac{1}{2}$ to 28 hundred weight english.

MEASURE of wood, for firing. See the article **CORD of wood**.

MEASURE for horses, is the hand, which by statute contains four inches.

MEASURE is also used to signify the cadence and time observed in poetry, dancing, and music, to render them regular and agreeable. See **METRE**.

MEASURE, in music, the interval or space of time which the person who beats time takes between the rising and falling of his hand, in order to conduct the movement sometimes quicker and sometimes slower, according to the music or subject that is to be sung or played. See **TIME**.

MEAT, *cibus*, in medicine. See the articles **FOOD**, **DIET**, **DRINK**, &c.

MEATH, the name of two counties in Ireland, in the province of Leinster, distinguished by the epithets east and west.

MEATUS AUDITORIUS, in anatomy, the auditory passage. See **EAR**.

The entrance of this passage is guarded by hairs, as well to keep out foreign bodies, as to break the impetus of the external air; and for much the same purposes does the cerumen, or ear-wax, serve. See the article **CERUMEN**.

Anatomists likewise gave the name of meatus cysticus, to the biliary duct; and meatus urinarius, to the urinary passage in women. See **BILE**, **URINE**, &c.

MEAUX, a city of France, twenty-four miles north east of Paris.

MEB, or **WINDER-MEB**, a bird of the larus or gull-kind, about the size of a widgeon. See the article **LARUS**.

MECCA, the capital of Arabia, and place of Mahomet's nativity: east long. $43^{\circ} 30'$, north lat. $21^{\circ} 20'$.

It is a large well-built city, in the middle of which stands the caaba, or temple. See the article **CAABA**.

MECHANICS, that branch of practical mathematics which considers motion and moving powers, their nature and laws, with their effects in machines. See the article **MACHINE**.

The term mechanics is equally applied to the doctrine of the equilibrium of powers, more properly called statics; and

to that science which treats of the generation and communication of motion, which constitutes mechanics strictly so called. See **STATICS**, **POWER**, **MOTION**, &c. The knowledge of mechanics is one of those things, says Mr. Mac Laurin, that serves to distinguish civilized nations from barbarians. It is by this science, that the utmost improvement is made of every power and force in nature; and the motions of the elements, water, air, and fire, are made subservient to the various purposes of life; for however weak the force of man appears to be, when unassisted by this art; yet, with its aid, there is hardly any thing above his reach. It is distinguished, by Sir Isaac Newton, into practical and rational mechanics; the former of which treats of the mechanical powers, *viz.* the lever, balance, axis and wheel, pulley, wedge, screw, and inclined plane. See the articles **LEVER**, **BALLANCE**, &c.

Rational mechanics comprehends the whole theory of motion; shews, when the powers of forces are given, how to determine the motions that are produced by them; and, conversely, when the phenomena of the motions are given, how to trace the powers or forces from which they arise. See **MOTION**.

Thus it appears, that the whole of natural philosophy, besides describing the phenomena of nature, is little more than the proper application of rational mechanics to those phenomena: in tracing the powers that operate in nature from the phenomena, we proceed by analysis; and in deducing the phenomena from the powers or causes that produce them, we proceed by synthesis. But in either case, in order to proceed with certainty, and make the greatest advances, it is necessary that the principles of mechanics should be clearly established; which has already been done under the articles **INERTIA**, **GRAVITY**, **EXPERIMENTAL PHILOSOPHY**, and **COMMUNICATION of motion**.

For though the causes of the motions, the nature of the impressed force, or of the resistance, be unknown or obscurely understood; yet this obscurity does not hinder us from tracing its effects in mechanics with sufficient evidence, provided we can subject its action to a just mensuration: and, in fact, we know that excellent contrivances have been invented for raising weights, and overcoming their resistances, by those who gave themselves

no trouble to enquire into the cause of gravity.

The mechanical powers, according to their different structure, serve for different purposes; and it is the business of the skilful mechanic to choose them, or combine them, in the manner that may be best adapted to produce the effect required, by the power he is possessed of, and at the least expence. The lever can be employed to raise weights a little way only, unless the engine itself be moved; as, for example, to raise stones out of their beds, in quarries. But the axis and wheel serve for raising weights from the greatest depths. The pulleys being easily portable aboard ships, are therefore much employed in them. The wedge is excellent for separating the parts of bodies; and the screw, for compressing or squeezing them together; and its great friction is sometimes of use, to preserve the effect already produced by it.

The strength of every engine, and of all its parts, must be proportioned to the effects which they are to produce. And as we found, when treating of the lever, that the fulcrum placed between the power and weight must sustain the sum of their efforts, therefore a small balance ought not to be employed for weighing great weights; neither, on the other hand, are great engines proper for producing small effects. See the articles *ENGINE*, *MILL*, &c.

But besides the raising of weights, and overcoming resistances, we have often other objects in view; as to make clocks and watches, to measure time as exactly as possible; and to construct machines, that by their movements, may illustrate the motions of the heavenly bodies, as orreries, planetariums, cometariums, &c. See the articles *CLOCK*, *ORRERY*, *PLANETARIUM*, &c.

MECHANICAL, an epithet applied to whatever relates to mechanics: thus we say, mechanical powers, causes, &c. See the articles *POWER*, *CAUSE*, &c.

The mechanical philosophy is the same with what is otherwise called corpuscular philosophy. See *CORPUSCULAR*.

This manner of reasoning is much used in medicine, and according to Dr. Quincy, is the result of a thorough acquaintance with the structure of animal bodies: for considering an animal body as a composition out of the same matter, from which all other bodies are formed, and to have all those properties which concern a physi-

cian's regard, only by virtue of its peculiar construction; it naturally leads a person to consider the several parts, according to their figures, contexture, and use, either as wheels, pulleys, wedges, levers, screws, cords, canals, strainers, &c. For which purpose, continues he, it is frequently found helpful to design in diagrams, whatsoever of that kind is under consideration, as is customary in geometrical demonstrations.

For the application of this doctrine to the human body, see the article *HUMAN*.

MECHANICAL, in mathematics, denotes a construction of some problem, by the assistance of instruments, as the duplication of the cube and quadrature of the circle, in contradistinction to that which is done in an accurate and geometrical manner.

MECHANICAL CURVE, is a curve, according to Descartes, which cannot be defined by any algebraic equation: and so stands contradistinguished from algebraic or geometrical curves.

Leibnitz and others call these mechanical curves transcendental, and dissent from Descartes in excluding them out of geometry. Leibnitz found a new kind of transcendental equations, whereby these curves are defined: but they do not continue constantly the same in all points of the curve, as algebraic ones do. See the article *TRANSCENDENTAL*.

MECHLIN, a large well built and fortified city of Brabant, twelve miles north-east of Brussels.

MECHOACAN, a province of Mexico, bounded by Panuco, on the north; by Mexico Proper, on the east; by the Pacific ocean, on the south; and by Guadalajara, or New Galicia, on the west.

MECHOACAN, in the materia medica, a large root of a plant of the convolvulus or bindweed-kind. It is of a somewhat rough surface, marked with several imperfect annular furrows; but it is always sent over in slices, to which it has been cut for the convenience of drying it. The root in powder is a gentle and mild purgative: it does not occasion sickness or gripings during its operation: and it is recommended by many in preference to jalap in all chronic cases occasioned by obstructions of the viscera; but it is now little used. Its dose is from one to two drams.

MECKLENBURG DUTCHY, a province of Germany, in the province of Lower Saxony, about 100 miles long, and 60 broad;

broad; bounded by the Baltic sea, on the north; by Pomerania, on the east; by Brandenburg, on the south; and by the dutchies of Holstein, Lunenburg and Lawenburg; on the west.

MECON, a great river, which rises in the north of further India, and running south through the kingdoms of Laos and Cambodia, falls into the Indian ocean.

MECONIUM, in medicine, a black thick fæces gathered in the intestines of infants and brought with them into the world at the time of their birth. The retention of these fæces is one of the diseases to which infants are liable; for the cure of which, see the article **INFANT**.

MECONIUM, in pharmacy, the extract of english poppies.

Meconium has all the virtues of the foreign opium, but in a somewhat lower degree. See the article **OPIMUM**.

MEDAL, a piece of metal in the form of coin, intending to convey to posterity the portrait of some great person, or the memory of some illustrious action.

The parts of a medal are the two sides, one of which is called the face, or head, and the other the reverse. On each side is the area, or field, which makes the middle of the medal; the rim, or border; and the exergum: and on the two sides are distinguished the type, or the figure represented, and the legend, or inscription.

As to the antiquity of medals, the greek are certainly the most antient; for long before the building of Rome, the Greeks had beautiful money in gold, silver, and copper. This plainly appears from several genuine medals of Macedon, older than Philip and Alexander; from greek medals with the names of several magistrates prior to the macedonian empire; to which we may add some sicilian coins of still greater antiquity. As the greek medals are the most antient, so are they the most beautiful; they have a design, accuracy, force and delicacy that expresses even the muscles and veins, and are struck with such exquisite art, as the Romans could never come up to. Those struck when Rome was governed by consuls, are the most antient among the Romans; but the copper and silver medals do not go beyond the 4th year of Rome, nor the gold, beyond the year 546. Among the imperial medals, we distinguish between the upper and lower empire: the first commenced under Julius Cæsar, and ended A. D. about 260;

the lower empire includes near 1200 years, and ends at the taking of Constantinople. It is the custom, however, to account all the imperial medals till the time of the Paleologi, among the antique tho' we have none of any considerable beauty later than the time of Heraclius, who died in 641. The gothic medals make part of the imperial ones. Modern medals are those struck within these 300 years. There are no true hebrew medals, except a few shekels of copper and silver, but none of gold; tho' there is mention made of one in the king of Denmark's cabinet.

There was formerly no difference between money and medals. An old Roman had his purse full of the same pieces that we now preserve in cabinets. As soon as an emperor had done any thing remarkable, as gaining a victory, giving up a tax, or the like, it was immediately stamped on a coin, and became current through his whole dominions. This was a pretty device to spread abroad the virtues of an emperor, and make his actions circulate; and thus a fr-sh coin was a kind of gazette, that published the latest news of the empire.

Several of our modern coins have the legend round the edges: but the antients were too wise to register their exploits on so nice a surface. As to the figures upon medals, the Romans always appear in the proper dress of their country, so that we may observe the little variations of the mode in the drapery of the medal: they would have thought it ridiculous to have drawn an emperor of Rome in a grecian cloak, or a phrygian mitre. On the contrary, we often see a king of England or France, dressed up like a Julius Cæsar, as if they had a mind to pass themselves upon posterity for roman emperors. Nothing is more usual than to see allusions to roman customs and ceremonies on the medals of our own nation; nay, they very often carry the figure of an heathen god. If posterity take its notions of us from our medals, they must fancy that one of our kings paid a great devotion to Minerva, another to Apollo, &c. or, at least, that our whole religion was a mixture of paganism and christianity. Had the old Romans been guilty of the same extravagance, there would have been so great a confusion in their antiquities, that their coins would not have had half the use we now find in them.

The use of medals is very considerable : they give a very great light into history, in confirming such passages as are true in old authors, in reconciling such as are told in different manners, and in recording such as have been omitted. In this case a cabinet of medals is a body of history. It was, indeed, the best way in the world to perpetuate the memory of great actions, thus to coin out the life of an emperor, and to put every exploit into the mint. It was a kind of printing before the art was invented ; and they have this advantage over books, that they tell their story quicker, and sum up a whole volume in twenty or thirty reverses : thus Mr. Vaillant, out of a small collection of medals, has given us a chronicle of the kings of Syria. They are, indeed, the best epitomes in the world, and let us see, with one cast of the eye, the substance of above an hundred pages. Another use of medals is, that they not only shew the actions of an emperor, but at the same time mark out the year in which they were performed ; for as every exploit has its date set to it, a series of an emperor's coins is his whole life digested into annals. A medallist, upon the first naming of an emperor, will immediately tell his age, family, and life. To remember where he enters in the succession, he only considers in what part of the cabinet he lies ; and by running over in his thoughts such a particular drawer, will give an account of all the remarkable parts of his reign. Nor are medals of less use in architecture, painting, poetry, &c. A cabinet of medals is a collection of pictures in miniature, and by them the plans of many of the most considerable buildings of antiquity are preserved.

Impressions of MEDALS. A very easy and elegant way of taking the impressions of medals and coins, not generally known, is thus directed by Dr. Shaw : melt a little isinglass-glue made with brandy, and pour it thinly over the medal, so as to cover its whole surface ; let it remain on for a day or two, till it is thoroughly dry and hardened, and then taking it off, it will be fine, clear, and hard, as a piece of muscovy-glass, and will have a very elegant impression of the coin.

Another easy method is as follows : Take a perfect and sharp impression in the finest black sealing-wax, of the coin or medal you desire. Cut away the wax round the edges of the impression ; then with a preparation of gum water, of the

colour you would have the picture, spread the paint upon the wax-impression with a small hair-pencil, observing to work it into all the sinking or hollow places, these being the rising parts of the medal ; and the colour must be carefully taken from the other parts with a wet finger. Then take a piece of very thin post-paper, a little larger than the medal, and moisten it quite through. Place it on the wax-impression, and on the back of the paper lay three or four pieces of thick woollen cloth or flannel, of about the same size. The impression, with its coverings, should be placed between two smooth iron plates, about two inches square, and one tenth of an inch thick. These must be carefully put into a small press, made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickness, having a couple of long male screws running thro' them, with a turning female screw on each, to force the plates together. These being brought evenly together, by means of the screws, will take off a true and fair picture of the medal ; which, if any deficiencies should appear, may easily be repaired with a hair pencil, or pen, dipped in the colour made use of.

If a relievo only be desired, nothing is necessary, but to take a piece of card, or white paste-board, well soaked in water, then placing it on the wax-mould, without any colouring, and letting it remain in the press for a few minutes, a good figure will be obtained.

This method of taking off medals, &c. is convenient, and seems much more so than the several inventions usually practised in sulphur, plaster of Paris, paper, &c. wherein a mould must be formed, either of clay, horn, plaster, or other materials, which requires a good deal of time and trouble.

MEDALLION, or MEDALION, a medal of an extraordinary size, supposed to be antiently struck by the emperors for their friends, and for foreign princes and ambassadors ; but that the smallness of their number might not endanger the loss of the devices they bore, the Romans generally took care to stamp the subject of them upon their ordinary coins.

Medallions, in respect of the other coins, were the same as modern medals in respect of modern money : they were exempted from all commerce, and had no other value but what was set upon them by the fancy of the owner. Medallions

are so scarce that there cannot be any set made of them, even though the metals and sizes should be joined promiscuously.

MEDELIN, a town of Spain, twenty miles east of Merida.

MEDELPADIA, a small province of Sweden lying northward of Helsingia.

MEDENBLICK, a port-town of Holland, situated on the Zuyder sea, ten miles north of Hoorn.

MEDEOLA, in botany, a genus of the hexandria-trigynia class of plants, the flower of which consists of six oblong, patent, and revolute petals: the fruit is a berry of a roundish form, with three cells, in each of which is contained a single cordated seed.

MEDIA, in geography, the antient name of Gilan. See the article **GILAN**.

MEDIAL, or **ALLIGATION MEDIAL**, in arithmetic. See **ALLIGATION**.

MEDIAL VOICE, *vox media*, in greek grammar. See the article **VOICE**.

MEDIANA, a vein formed by the concurrence of the cephalic and basilic veins in the bend of the elbow.

MEDIASTINA, in anatomy, a name given to both a vein and an artery of the mediastinum. See the next article.

MEDIASTINUM, in anatomy, is a double membrane continuous to the sternum, situated under it, and adhering firmly to it. It divides the cavity of the thorax longitudinally into two parts: but as it is not exactly under the middle of the sternum, but somewhat to the left side, the right part of the thorax is larger than the left.

The mediastinum is connected with the sternum, pleura, pericardium, and other adjoining parts. It receives veins and arteries from the mammary and diaphragmatic vessels, and sometimes has proper and particular ones of its own from the aorta and cava: these are then called the mediastinal vessels. Its nerves, which are small, are from the diaphragmatics and the par vagum. It has also a number of lymphatics, which run to the ductus thoracicus.

The uses of the mediastinum are two. The first is to divide the breast longitudinally into two parts, by which several great purposes are answered; as, 1. That on one of the lobes of the lungs being ulcerated, the other might not be immediately affected. 2. That water, matter, or any thing else contained in one part of the thorax, might not at the same time affect both parts of the lungs. 3.

That in case of a wound in one side of the thorax, respiration might be continued in the other, and the person not be immediately suffocated. The second general use of the mediastinum, is to support the heart in its pendulous state, for the benefit of its free motion, especially when we lie on our backs.

MEDIASTINUM CEREBRI, the same with the transverse septum of the brain. See the article **BRAIN**.

MEDIATE, or **INTERMEDIATE**, something that stands between and connects two or more terms, considered as extremes; in which sense it is opposed to immediate.

MEDICAGO, in botany, a genus of the diadelphia decandria class of plants, with a papilionaceous flower, and a long compressed and crooked pod for its fruit.

This genus comprehends the medicago, medica falcata, and cochleata of authors.

MEDICINE, *medicina*, the art which treats of the means of preserving health, when present; and of restoring it, when lost. If we look back to the origin of the art of medicine, we shall find its first foundations to be owing to mere chance, unforeseen events, and natural instinct: in the early ages, the sick were placed in cross-ways, and other public places, to receive the advice of those passengers who knew an efficacious remedy suitable to their disorder. And the better to preserve the memory of a remarkable cure, both the disease and the remedy were engraved on pillars, or written on the walls of temples, that patients in the like cases might have recourse to them for instruction and relief. Thus what mere accident had discovered, was registered in these chronicles of health. This art arose from repeated trials and long experience, which gave an insight into the virtues of herbs and plants, metals and minerals.

As to the part which reason has acted in the improvement of medicine, it seems to have consisted in observing, 1. That diseases attended with particular circumstances, called symptoms, were sometimes cured without the assistance of art, by spontaneous evacuations, as hæmorrhages, diarrhoeas, vomitings, or sweats; whence bleeding, purges, and vomits took their rise. 2. That the patients were often relieved, by the breaking out of various tumours; whence arose the application of topical remedies. And, indeed, it is the best method of improving

ing physic, to observe carefully what means nature, unassisted by art, employs to free the constitution from distempers; since many important hints may be thence taken, for the relief of other patients under the like circumstances.

So much for the rise of this art. Let us now say something of the regular method of studying it. And first, with Boerhaave, let us imagine the young student laying the foundation of his art in the contemplation of geometrical figures, bodies, weights, measures, velocity, the fabric of machines, and the power of acting upon other bodies thence arising. While he employs his thoughts about these matters, he is likewise taught a just method of reasoning; after which he may proceed to inform himself of the properties of fluidity, elasticity, tenuity, weight, and tenacity of liquids, from hydrostatics. His reason being by this time much improved, he next applies to study the forces of fluids upon machines, and of these upon fluids; and to demonstrate them by mathematics, confirm them by hydrostatics, and illustrate them by chemical experiments; at the same time entertaining himself with speculations on the nature of fire, water, air, salts, and other homogeneous bodies. Having laid this foundation, his next business is to apply himself to the study of anatomy, in order to obtain a clear idea of the human fabric. To this he joins the knowledge of the vital fluids, and examines them with the assistance of anatomy, chemistry, hydrostatics, and even of the microscope; and so now you see him qualified for writing a theory of health, and investigating the causes of diseases. Now behold him busied in furnishing himself with medicinal observations, from all quarters; sometimes he dissects the dead bodies of persons, whose diseases he had observed; at other times, he marks the symptoms of sickness procured by art in brutes; and at length collecting together all the effects of diseases, with their remedies, whether learned from his own experience, or found in the best authors, he digests, considers, and compares them with those which are demonstrated by theory. This, he tells us, is the method which he took himself, and which he recommended to his pupils, in order to gain a thorough knowledge of medicine.

If, then, he would advance the healing art, he ought to collect a select treasure

of practical observations, rest satisfied with a few but well chosen medicines, be thoroughly acquainted with their virtues and efficacy in different constitutions and diseases, despise the cumbersome load of recipes with which practical writers of an inferior rank abound, reject the so much extolled medicines of the chemists, and attempt the relief of patients by a proper diet and exercise, and such medicines as observation and sound philosophy recommend: for to the improvement of anatomy and natural philosophy is much of the success of physic to be attributed. The knowledge of medicines, or suitable remedies, is also highly necessary to physicians; who, in order to moderate the impetus in acute disorders, make evacuations, blunt acrimony, dilute too thick fluids, condense those that are too thin, brace up too lax parts, and relax such as are too much constricted; they also derive the humours to parts where they will be least prejudicial, upon occasion mitigate pain, and in languors, use stimulating medicines. Wine, vinegar, barley, nitre, honey, rhubarb, opium, and other simples, are found both safe and powerful medicines. Sydenham tells us, that all manner of diseases may be cured by bleeding, purging, with a subsequent opiate, and proper regimen. In chronical cases, mineral waters, salts, diaphoretics, soap, mercury, steel, with a few vegetables, and proper exercise, will generally effect the cure.

As to the drugs recommended by the ancients, adds Boerhaave, we are, and always shall be ignorant of them, unless perhaps a few; since they contented themselves with giving the virtues; omitting the description of plants, as things well known. The moderns, on the other hand, have been accurate in the descriptive part, but have given us very little concerning the virtues of plants, except what they transcribed from the ancients, and this upon an uncertain supposition of the plants being the same. To conclude, what is there in the most elaborate preparation, that is worth half the pains taken about it? Mercury, opium, the peruvian bark, and other simples, with fire and water, are acknowledged as the surest remedies by the ablest masters of the art; and these are found to be more efficacious in that crude state, in which bountiful nature has imparted them to us, than after the most operose and artificial preparations.

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We can despair of nothing, while we follow simplicity; but the event of intricate labour is fallacious.

As to the general divisions of medicine, they are these. 1. Physiology, or the doctrine of the animal œconomy, the use of the several parts, whether solids, vessels, or fluids: under this branch is comprehended anatomy. 2. Hygiene, which lays down rules for the preservation of health, and the prolongation of life: its objects are chiefly the fix non-naturals. 3. Pathology, or the doctrine of diseases, their differences, causes, symptoms, and other accidents. 4. Semeiotice, is that part of medicine which treats of the signs of diseases, and their use; as also how the various degrees and effects of health and sickness may be known. 5. Therapeutice, is the last and principal part, comprehending diet, pharmacy, surgery, and the method of cure; considering the materia medica, the preparation of remedies, and the manner of using them, in order to recover health and banish diseases. See the article *PHYSIOLOGY, &c.*

MEDICINES, *medicamenta*, whatever substances serve to restore health. See the article *MATERIA MEDICA, supra*.

Medicines are either simple or compound; the former being formed by nature alone, and the latter owing to the industry of men, by variously mixing the simple ones together.

Medicines are likewise distinguished, from the manner of using them, into internal or external; and with regard to their effects, they are said to be astringent, cathartic, emetic, &c. See *ASTRINGENTS, CATHARTICS, &c.*

Mechanical operation of MEDICINES.

To account for the operations of medicines mechanically, seems to have been the favourite scheme of physicians and physiologists of the last and present century. Stahl and his disciples reject these accounts, and think them sufficiently refuted by the operation of opium, and of astringents. One grain of opium, properly taken, will, for a time, assuage pains all over the body. A very few grains of crocus martis astringens sometimes stop an hæmoptysis, before they can be supposed to have entered into the humours of the body. Is it not past all belief, say they, that so few grains, mixed with so many pounds of fluids, should retain any mechanical force, especially as it is well known, that astringents lose their force by dilu-

tion. They farther urge, that the various effects of the same medicine are a refutation of the mechanical hypothesis; thus emetics sometimes purge, and *vice versa*; astringents encrease hæmorrhages; opium excites alacrity in some instead of stupifying. Again, the sight, or even bare imagination of some medicines, will produce a sensible effect on the body, without any contact. Stahl and his followers therefore hold, that medicines operate chiefly by exciting the vital sense; and that this is the chief effect of medicines, even where they seem most to act mechanically.

Hoffman, Heister, and others, have attacked the hypothesis of Stahl. We shall not pretend to give any farther account of the controversy. Perhaps in this, as in others, there may be a good deal of logomachy. Strictly speaking, mechanical principles must be insufficient to account for the operation of medicines, as this sometimes undoubtedly depends (in the primæ viæ at least) on chemical principles; and no body has hitherto been able to account mechanically for the phænomena of chemistry. The laws of the minima naturæ have not hitherto been reduced to those of the pressure and impulse of large sensible masses. And perhaps when the laws, that obtain in the minute parts of matter, have been found, we shall still be at a loss to account for all the phænomena of animated bodies, particularly the human.

Pocket-MEDICINES, in surgery, those which a surgeon ought to carry always about him, in a box or convenient case. Those, according to Heister, are the common digestive ointment, and the brown or egyptian ointment, for cleansing and digesting foul ulcers, and some vulnerary balsams, as the linimentum Arcæi, or the balsam of Peru, of Gilead or Capivi, or the Samaritan balsam: to these must also be added a plaster or two, as the diachylon, or stypticum Crollii, since one or other of these is almost constantly wanted. Neither should there be wanting a piece of blue vitriol for the taking down luxuriant flesh, and to stop hæmorrhages; but if vitriol is wanting, burnt alum, red precipitate, the infernal stone, or any other corrosive medicine, will supply its place in corrosive intentions, and the last will also serve to open abscesses, to make issues, and perform many other operations of that kind.

With these there should always be kept
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in readiness also a quantity of scraped lint, that the surgeon may be able to give immediate assistance to wounded persons, since, if he is unprepared for this, they may easily be taken off by an hæmorrhage; a circumstance which ought also to prevail with him to be always provided with suitable bandages. See the article BANDAGE.

MEDIETAS LINGUÆ, in law, signifies a jury, or inquest impanelled, of which the one half are natives of this land, and the other foreigners. This jury is never used except where one of the parties in a plea is a stranger, and the other a denizen. In petit-treason, murder, and felony, foreigners are allowed this privilege, but not in high-treason, because an alien in that case shall be tried according to the rules of the common law, and not by a medietas linguæ. A grand jury ought not in any case to be of a medietas linguæ, and the person that would have the advantage of a trial in this way, is to pray the same, otherwise it will not be permitted on a challenge of the jurors.

MEDIMNUS, μέδιμνος, in grecian antiquity, a measure of capacity. See the article MEASURE.

MEDINA, a city of Arabia Deserta, situated two hundred miles north-west of Mecca: in east long. $40^{\circ} 35'$, north lat. $24^{\circ} 30'$.

This is called the city of the prophet, on account of Mahomet's being received and protected by the inhabitants on his flight hither from Mecca, where the mahometan æra commences.

MEDINA CELI, a city of Spain, in the province of Old Castile, and territory of Siquenca, situated in west long. $2^{\circ} 45'$, north lat. $40^{\circ} 20'$.

MEDINA SIDONIA, a city of Spain, in the province of Andalusia, twenty miles east of Cadiz.

MEDINA DEL RIO SECCO, a city of Spain, in the province of Leon, fifty two miles south-east of the city of Leon.

MEDINA DEL CAMPO, another city of Spain, in the province of Leon, fifty miles north-east of Salamanca.

MEDITERRANEAN SEA, extends from the Straits of Gibraltar, to the coasts of Syria and Palestine, being upwards of 2000 miles in length, but of a very unequal breadth; the west-part of it separates Europe from Africa; and the Levant or east-part of it, divides Asia from Africa. See EUROPE, &c.

MEDITULLIUM, is used by anatomists for that spongy substance between the two plates of the cranium, and in the interstices of all laminated bones. See the article DIPLOE.

MEDIUM, in logic, the mean or middle term of a syllogism, being an argument, reason, or consideration for which we affirm or deny any thing: or, it is the cause why the greater extreme is affirmed or denied of the less in the conclusion. See the articles SYLLOGISM, EXTREMES, and CONCLUSION.

MEDIUM, in arithmetic, or *arithmetical* MEDIUM, or MEAN, called in the schools, medium rei, that which is equally distant from each extreme, or which exceeds the lesser extreme as much as it is exceeded by the greater, in respect of quantity not of proportion: thus 9 is a medium between 6 and 12. See the article PROPORTION.

Geometrical MEDIUM, called in the schools medium personæ, is that where the same ratio is preserved between the first and second, as between the second and third terms, or that which exceeds in the same ratio, or quota of itself, as it is exceeded: thus 6 is a geometrical medium between 4 and 9.

MEDIUM, in philosophy, that space or region through which a body in motion passes to any point; thus æther is supposed to be the medium through which the heavenly bodies move; air, the medium wherein bodies move near our earth; water, the medium wherein fishes live and move; and glass is also a medium of light, as it affords it a free passage. That density or consistence in the parts of the medium, whereby the motion of bodies in it is retarded, is called the resistance of the medium, which together with the force of gravity, is the cause of the cessation of the motion of projectiles.

Subtile or *ætherial* MEDIUM. Sir Isaac Newton makes it probable, that besides the particular aerial medium, wherein we live and breathe, there is another more universal one, which he calls an ætherial medium, vastly more rare, subtile, elastic, and active than air, and by that means, freely permeating the pores and interstices of all other mediums, and diffusing itself through the whole creation; and by the intervention hereof, he thinks it is that most of the great phænomena of nature are effected. This medium he seems to have recourse to, as the first and most remote physical spring, and the ultimate

ultimate of all natural causes. By the vibrations of this medium, he takes heat to be propagated from lucid bodies, and the intenseness of heat increased and preserved in hot bodies, and from them communicated to cold ones. By this medium, he takes light to be reflected, inflected, refracted, and put alternately in fits of easy reflection and transmission, which effects he elsewhere ascribes to attraction; so that this medium appears the source and cause even of attraction. Again, this medium being much rarer within the heavenly bodies than in the heavenly spaces, and growing denser as it recedes further from them, he supposes the cause of the gravitation of these bodies towards each other, and of the parts towards the bodies. Again from the vibrations of this same medium excited in the bottom of the eye, by the rays of light, and thence propagated through the capillaments of the optic nerves into the sensory, he takes vision to be performed; and so hearing from the vibrations of this or some other medium excited in the auditory nerves by the tremors of the air, and propagated through the capillaments of the nerves into the muscles; and thus contracting and dilating them.

The elastic force of this medium, he shews, must be prodigious. Light moves at the rate of 70,000,000 miles in about seven minutes, yet the vibrations and pulses of this medium, to cause the fits of easy reflection and easy transmission, must be swifter than light, which is 700,000 times swifter than sound. The elastic force of this medium therefore in proportion to its density must be above 490,000,000,000 times greater than the elastic force of the air in proportion to its density; the velocities and pulses of the elastic mediums, being in a subduplicate ratio of the elasticities and the rarities of the mediums taken together; and thus may the vibrations of this medium be conceived as the cause of the elasticity of bodies.

MEDLAR, MESPILUS, in botany, &c. See the article MESPILUS.

MEDNICK, a city of Poland in the province of Samogitia: east long. $22^{\circ} 15'$, north lat. 56° .

MEDULLA, MARROW, in anatomy. See the article MARROW.

MEDULLA OBLONGATA, is the lower and medullary part of the cerebrum and ce-

rellum, formed into a kind of tail, and extended to the great foramen or hole in the occipital bone of the cranium, where it gives origin to the spinal marrow, and to the nerves of the brain. See the articles BRAIN and NERVES.

MEDULLA SPINALIS, or spinal marrow, is a continuation of the medulla oblongata of the brain, and forms, as it were, a tail to that part. It is included in a kind of bony canal, formed by the vertebræ, and in this is continued from the head to the extremity of the os sacrum. Its length is therefore the same with that of the spina dorsi, which is different in persons of different stature. Its thickness, in general, is nearly equal to that of a finger; but it is not uniformly of the same diameter throughout. Its substance in the upper part, as far as to the last vertebra of the thorax, is the same with that of the medulla oblongata of the brain; but somewhat tougher and more firm: they are externally of a medullary substance, that the nerves may easily make their way out; internally cineritious, and of the same nature with the cineritious or cortical part of the brain: but the lower part of them, from the last vertebra of the thorax to the extremity of the os sacrum, is fibrous and very tenacious, and is called cauda equina. The division of the spinal marrow is formed by means of a fissure; it is by this separated into a right and left part, or into two columns; but this separation is not continued to the center. Its proper integuments are no less than six; these are, 1. The bony canal, formed by the cavities of the twenty four vertebræ, and the os sacrum: 2. The tunica, which is very strong, and connects the vertebræ within: 3. The cellular, or adipose coat, which, in fat persons, always contains more or less fat, and seems destined by nature to soften the former: 4. The dura mater, which is stronger in the upper part, and finer and weaker in the lower; this loosely incloses the medulla in the spine, and, in its anterior part, is firmly connected with the vertebræ: 5. The tunica arachnoides, which in its anterior part, adheres very firmly to the pia mater, but in its posterior part is loose and fluctuating: 6. The pia mater, which surrounds every part of the spinal marrow, and all the nerves that arise from it, and enters also its longitudinal division. The arteries and

veins of the spinal marrow enter at the apertures of the vertebræ, which give passage out to the nerves: they make a multitude of anastomoses, and are derived from the vertebrals of the neck, the intercostals, and the lumbar. The nerves of the spine are thirty-one, or as others count them, thirty-two pair. These are composed each of a multitude of fibres, arising from the anterior and posterior parts of the medulla: these fibres afterwards unite, and are connected by and covered with membranes, and in that state they constitute what we call nerves.

The uses of the spinal marrow are, to give origin to the before-mentioned pairs of nerves, which are principally distributed to the limbs and external parts; and to secrete and prepare a nervous fluid.

MEDUSA, in zoology, a genus of naked insects, the body of which is of an orbiculated figure and convex, and is of a gelatinous substance, and not hairy: the tentacula, or the plicæ, which are in the place of them, are situated in the center of the under part of the animal.

Authors have described several of the species of this genus, under the names pulmo marinus and urtica marina. See the articles **PULMO** and **URTICA**.

MEDUSA'S HEAD, in astronomy. See the article **ALGOL**.

MEDUSA'S HEAD, in natural history, a name given by some to the star-fish. See the articles **STAR-FISH**.

MEDWAY, a river which rises in Ashdown Forest in Suffex, and running through Kent, is divided into two branches by the Isle of Sheppey, one of which is called East Swale, and the other West Swale.

MEETER, or **METRE**. See **METRE**.

MEGEN, a town of Dutch Brabant, ten miles south-west of Nimeguen.

MEGIERS, a town of Transilvania, subject to the house of Austria: east long. $24^{\circ} 25'$, north lat. $47^{\circ} 5'$.

MEHAIGN, a river of the Austrian Netherlands, which rises in the province of Namur, and falls into the Maes, a little west of Huy.

MEI, or **MISERERE MEI**, in medicine. See the article **MISERERE**.

MEISSEN, once the capital of the marquisate of Miffen or Misnia, in Upper Saxony, on the river Elbe, ten miles north of Dresden.

MEL, **HONEY**. See the article **HONEY**.

MELAMPODIUM, in botany, a genus of the syngenesia polygamia necessaria class of plants, the compound flower of which is radiated, and the particular hermaphrodite ones infundibuliform, and situated on the disc: the stamina are five very small filaments: the receptacle of the seeds is paliaceous.

MELAMPYRUM, a genus of the didynamia angiospermia class of plants, with a ringent monopetalous flower, and a roundish bilocular capsule for its fruit, containing a number of seeds.

MELANCHOLY, in medicine, a kind of delirium, attended with gloomy thoughts, heaviness and sorrow, without any apparent cause; arising from an excessive congestion of blood in the brain. This dreadful disease is nearly allied to madness, and only differs from it in degree. See the article **MADNESS**.

MELANE, among physicians. See the article **ALPHOS**.

MELANTERIA, in natural history, a very beautiful fossil of a dense, compact, and regular texture, and of an extremely bright pale-yellow, resembling nothing so much as the purest gold: it is remarkably heavy, and is usually found in little irregular masses of the bigness of a pigeon's egg, which are broken with a slight blow; but it is usually met with in the form of a fine gold-coloured efflorescence or vitriolic and pyritical bodies; or in loose, shattery, and friable masses of a more dusky yellow, in which latter state it so much resembles a native sulphur, that it is frequently mistaken for one; however, it is not inflammable; but calcines in the fire to a greyish powder, which by burning longer changes to a deep and fine purple.

The Greeks used it externally, as a gentle escharotic and a styptic: they made it an ingredient in their ointments for old ulcers, and used to sprinkle the powder of it on fresh wounds to stop the hæmorrhage.

MELANTHIUM, in botany, a genus of the hexandria trigynia class of plants; the female flower of which has no cup, and is composed of five lanceolated petals: the fruit is an ovato-triangular capsule with three cells in each of which are contained several oblong, compressed, and membranaceous seeds.

MELANURUS, in ichthyology, a species of Sparus, variegated with a number of

longitudinal lines, and with a black spot on each side at the tail. See the article SPARUS.

MELASTOMA, in botany, a genus of the decandria digynia class of plants, the flower of which consists of five roundish petals; and its fruit is a roundish berry, with five cells, each containing a number of seeds.

MELAZZO, a town of Turkey, in the Lesser Asia, situated on a bay of the Archipelago: east long 28° , north lat. $37^{\circ} 20'$.

MELCHITES, in church-history, the name given to the Syriac, Egyptian, and other Christians of the Levant. The Melchites, excepting some few points of little or no importance, which relate only to ceremonies and ecclesiastical discipline, are in every respect professed Greeks; but they are governed by a particular patriarch, who resides at Damas, and assumes the title of patriarch of Antioch. They celebrate mass in the Arabian language. The religious, among the Melchites, follow the rule of St. Basil, the common rule of all the greek monks. They have four fine convents, distant about a day's journey from Damas, and never go out of the cloister.

MELCHIZEDECHIANS, in church-history, a sect which arose about the beginning of the third century, and affirmed, that Melchisedech was not a man, but a heavenly power, superior to Jesus Christ: for Melchisedech, they said, was the intercessor and mediator of the angels, but Jesus Christ was so only for men, and his priesthood only a copy of that of Melchisedech. This heresy was revived in Egypt by one Hierax, who pretended that Melchisedech was the Holy Ghost. See **HIERACITES**.

MELCK, a town of Germany, in Lower Austria, situated on the Danube, forty-seven miles west of Vienna.

MELCOMB REGIS, a borough town of Dorsetshire, six miles south of Dorchester. It sends two members to parliament.

MELDERT, a town of the Austrian Netherlands, in the province of Brabant, eight miles south of Lovain.

MELDORP, a town of the circle of Lower Saxony, and dutchy of Holstein: east long. $8^{\circ} 50'$, north lat. $54^{\circ} 40'$.

MELEAGRIS, the **TURKEY**, in ornithology. See the article **TURKEY**.

MELES, the **BADGER**, in zoology, is ranked by Linnæus under the same genus

with the civet-cat and ichneumon; in all which the fore-teeth are obtuse, and those of the upper jaw striated. They have likewise all a bag of secreted matter, situated near the anus. See the articles **ICHNEUMON** and **ZIBETHICUS**.

The badger is about the size of a small dog, with a short and thick body. Its fur is composed of bristly hairs, which being yellow towards the roots, of a blackish brown in the middle, and of a deeper yellow at the tips, give the creature an odd mixture of deep brown and pale yellow, which together form a kind of grey; whence the animal itself is called the grey, in many places. See plate **CLXXI**. fig. 2.

MELIA, the **BEAD-TREE**, in botany, belongs to the decandria-monogynia class of plants, the flower of which is composed of five long, patent, and lanceolated petals; the fruit is a soft, globose drupe, with a roundish nut, marked with furrows, and containing five cells, in each of which is an oblong kernel.

MELIA TERRA, in natural history, the same with melinum. See **MELINUM**.

MELIANTHUS, **HONEY-FLOWER**, in botany, a genus of the didynamia-poly-petala class of plants, the flower of which consists of four petals; and its fruit is a capsule with four cells, each containing a roundish seed.

MELIAPOUR, a city on the coast of Cormandel in India, and the same with St. Thomas. See **St. THOMAS**.

MELICA, in botany, a genus of the triandria digynia class of plants, the flower of which is composed of two valves, not aristated, and containing a single seed.

It is frequent in woods, and is called by authors gramen avenaceum, or oat-grass.

MELICERES, in surgery, a kind of encysted tumours, so called when their contents are of the consistence of honey; but when this is of the consistence of paste, they are called atheromata. See the articles **ATHEROMA** and **TUMOUR**.

MELIDA, an island in the gulph of Venice, situated on the coast of Dalmatia, subject to the republic of Ragusa: east long $18^{\circ} 30'$, north lat. $42^{\circ} 30'$.

MELILOT, *melilotus*, is by Linnæus accounted a species of trifolium. See the article **TRIFOLIUM**.

Melilot is scarce ever given internally, but externally used it is a great emollient,

ent, resolvent, and digestive. It is a good ingredient in cataplasms and fomentations, and also in clysters. It used to be an ingredient in the plaster, employed in dressing blisters; but it is now left out of that composition. The flowers are recommended by some in infusion, as a remedy for the fluor albus.

MELINDA, the capital of the province of the same name, and of all the Portuguese settlements on the coast of Malabar, in Africa: east long. 39° , south lat. 3° .

MELINUM, in natural history, the name of an earth, famous in the earliest ages of painting, being the only white of the great painters of antiquity; and, according to Pliny's account, one of the three colours with which alone they performed all their works. It is a fine, white, marly earth, of a very compact texture, yet remarkably light; a sort of texture which must render any earth fit for the painter's use, that is of a proper colour. It is frequently found forming a stratum in the earth, lying immediately under the vegetable mould. It is of a very smooth, but not glossy surface, is very soft to the touch, adheres firmly to the tongue, is easily broken between the fingers, and stains the skin in handling. It melts readily in the mouth, and is perfectly fine, leaving not the least grittiness between the teeth. Thrown into water, it makes a great bubbling and loud hissing noise, and moulders away into a fine powder. It does not ferment with acids, and suffers no change in the fire. These are the characters by which the melinum of the ancients is distinguished from all the other white earths. It is still found in the same place from whence the painters of old had it, which is that from whence it has its name, the island of Milo, called Melos by the Greeks, and is common in most of the adjacent islands. It has been of late tried here as a paint, and is found not to make so bright a white as the other substances now in use among the painters, but seems not liable, like them, to turn yellow; and if so, would be worth the consideration of persons in the colour trade, especially as it may be had in any quantities for carriage.

MELISSA; BAUM, in botany, a genus of the didynamia gymnospermia class of plants, with a monopetalous ringent flower, the lower lip of which is divided in-

to three segments, whereof the middle one is cordated: the seeds are four in number, and contained in the bottom of the cup. Baum is greatly esteemed, among the common people, as good in disorders of the head and stomach; but it is less regarded in the shops. It is most conveniently taken in infusion by way of tea; the green herb is greatly better than the dry, which is contrary to the general rule in relation to other plants.

MELITENSIS TERRA, *earth of Malta*, in the materia medica, an earth of which there are two very different kinds, the one of the genus of the boles, the other of the marles. The latter is that known by medicinal authors under this name; the former is the Malta earth now in use: but both being brought from the same place, are confusedly called by the same name. The maltese marle, which is the terra melitensis of medicinal authors, is a loose, crumbly, and very light earth, of an unequal and irregular texture, and when exposed to the weather, soon falls into fine soft powder; but when preserved and dried, it becomes a loose, light mass, of a dirty white colour, with a greyish cast: it is rough to the touch, adheres firmly to the tongue, is very easily crumbled to powder between the fingers, and stains the hands. Thrown into water it swells, and afterwards moulders away into a fine powder. It ferments very violently with acid menstrooms.

Both kinds are found in great abundance in the island of Malta, and the latter has been much esteemed as a remedy against the bites of venomous animals, but with how much justice we cannot say. The other has supplied its place in the german shops, and is used there as a cordial, a sudorific, and astringent. See **BOLE**.

MELITITES, in natural history, an indurated clay, so called from its yellowish or honey-like colour. See **LAPIS**.

MELITTIS, in botany, a genus of the didynamia angiospermia class of plants, the upper lip of whose cup is emarginated; the upper lip of its flower is plane, and the lower one crenated.

MELIUS INQUIRENDUM, in law, a writ that lies for a second inquiry to be made of what lands, &c. a man died seized; when partiality is suspected upon the writ diem clausit, &c.

MELLE, a town in the circle of Westphalia, in Germany, ten miles south-east of Osnaburg, subject to the elector of Cologne.

MEL.

MELLER, a large lake of Sweden, on the north side of which stands the capital city of Stockholm: it is eighty miles long, and thirty broad.

MELLILA, a port-town on the coast of Barbary, in the province of Fez: west long. 3° , and north lat. $35^{\circ} 50'$.

MELNICK, a town of Bohemia, twenty miles north of Prague.

MELOCHIA, in botany, a genus of the monadelphia-pentandria class of plants, the flower of which consists of five large petals, vertically cordated; and its fruit is a roundish capsule with five cells, in each of which is a single roundish seed.

MELODY, in music, the agreeable effect of different sounds, ranged and disposed in succession; so that melody is the effect of a single voice or instrument, by which it is distinguished from harmony. See the article **HARMONY**.

However, the term melody is chiefly applicable to the treble, this being chiefly distinguished by its air.

MELOE, the **OIL-BEETLE**, in zoology, a genus of insects, of the order of the coleoptera; the antennæ of which are slender and filiform; the exterior wings are dimidiated, and there are no interior ones. See **INSECTS** and **SCARABÆUS**.

MELON, *melo*, in botany, is accounted only a species of cucumber. See the article **CUCUMBER**.

Melon-seed is esteemed cooling and diuretic; being possessed of the same virtues with the other cold seeds, as they are called; and together with them is used in emulsions, and in some shop-compositions.

MELOTHRIA, in botany, a genus of the triandria-monogynia class of plants, the corolla whereof is composed of a single rotated petal; the tube is of the length of the cup, and every where grows to it; the limb is plane, and is divided into five very obtuse segments, broadest towards the edge; the fruit is an oval, oblong body, divided within into three parts, and containing a number of oblong, compressed seeds.

In Canada, Virginia, and Jamaica, where this fruit commonly grows, it is pickled for the table.

MELTING-CONE, in assaying, is defined by Cramer to be a small vessel made of copper or brass, of a conic figure, and of a nicely polished surface within; the use of which is to receive melted metals, and serve for their precipitation, which is effected, when two bodies melted toge-

ther, and yet not mixing perfectly with one another in the fusion, separate in the cooling into two strata, on account of their different specific gravity. See the article **PRECIPITATION**.

This precipitation might be made in the same vessel in which the fusion is performed; but then the melting-pot or crucible must be broken every time to get it out, whereas the conic shape, and polished surface of this vessel, makes it easily got out without any violence. The shape of this vessel is also of another use in the operation; for, by means of it, the heavy matter, subsiding to a point, is formed into a perfect and separate regulus, even where the whole quantity, as is very frequently the case, has been but very small. When the quantity of the melted matter is great, it is common to use, instead of this cone, a large brass or iron-mortar, or any other conveniently shaped brass or iron-vessel. It is necessary, when the cone is of brass, to be cautious that it be not made too hot; for the brittleness of that metal, when hot, makes it easily break, on the striking with any force on that occasion, to make the melted mass fall out.

These, and all other moulds for the receiving melted metals, must always be well heated before the mass is poured into them, lest they should have contracted a moisture from the air, or have been wetted by accident; in which case the melted metal will be thrown out of them with great violence and danger. They ought also to be smeared over with tallow on their inside, that the regulus may be the more easily taken out of them, and the surface of the mould not corroded by the melted mass poured in. If a very large quantity of a metal is, however, to be received into them, and especially, if any thing sulphureous have place among it, this caution of tallowing the moulds does not prove sufficient; for the large quantity of the mass makes it continue hot so long, that this becomes but a slight defence to the surface of the mould. In this case the assayer has recourse to a lute, reduced to a thin pap with water, which being applied in form of a very thin crust, all over the inside of the cone, or mould, soon dries up indeed, but always preserves the sides of the vessel from the corrosion of the mass.

MEMBER, in architecture, denotes any part of a building; as, a frieze, cornice, or the like. This word is also some-

sometimes used for the moulding. See the article MOULDING.

MEMBER, in grammar, is applied to the parts of a period or sentence. See the articles PERIOD, SENTENCE, &c.

MEMBER of parliament. See the article PARLIAMENT.

MEMBERS, in anatomy, the exterior parts arising from the trunk or body of an animal.

MEMBERED, or MEMBRED, in heraldry, is where the legs or feet of an eagle, griffin, or other bird, are of a different colour from the rest of the body.

MEMBRANE, in anatomy, a pliable texture of fibres, interwoven together in the same plane.

The membranes differ in thickness, according to the smallness of their fibres, or the number of their planes. These particular planes are termed laminæ, and are distinguished into internal, external, and middle. The difference of membranes, in general, depends on that of the fibres of which they are composed. Small portions of membranes, especially when they are very thin, are called pellicles; and some membranaceous laminæ are united together by the intervention of a particular substance, composed of this sort of pellicles, and called the cellular or spongy substance.

The membranes of the body are various, and variously denominated: such are the peritonæum, pericardium, pleura, &c. Those which serve as integuments, or covers of vessels, are called tunics or coats; and those which cover the brain, are called meninges. The muscles too are each enclosed in a peculiar membrane. The use of the membranes is to cover and wrap up the parts, and strengthen them; to save them from external injuries; to preserve the natural heat; to join one part to another; to sustain small vessels, and the nerves which run thro' their duplicatures; to stop the returning of the humours in their vessels, as the valves stop the returning of the blood in the veins and heart; of the chyle in the thoracic duct, and of the lymph in the lymphatic vessels.

MEMBRANOSUS, in anatomy, a muscle otherwise called fascia lata. See the article FASCIA.

MEMBRED, or MEMBERED, in heraldry: See the article MEMBERED.

MEMBRILLO, a town of Spain, fourteen miles south of Alcantara.

MEMECYLON, in botany, a genus of

the octandria-monogynia class of plants, the flower of which consists of four petals, and its fruit is a berry.

MEMEL, a port-town of Poland, seventy miles north of Königsberg: east long. 21° 30', north lat. 56°.

MEMMINGEN, a city of Germany, 25 miles south of Ulm.

MEMOIRS, in matters of literature, a species of history, written by persons who had some share in the transactions they relate; answering to what the Romans called commentarii, commentaries.

The journals of the proceedings of a literary society, or a collection of matters transacted therein, are likewise called memoirs.

MEMORY, *memoria*, a faculty of the human mind, whereby it retains or keeps the ideas it has once perceived. See the article IDEA.

Memory, says Mr. Locke, is, as it were, the store-house of our ideas; for the narrow mind of man not being capable of having many ideas under view at once, it was necessary to have a repository in which to lay up those ideas which it may afterwards have use of. But our ideas being nothing but actual perceptions in the mind, which cease to be any thing when there is no perception of them; this laying up of our ideas in the repository of the memory, signifies no more but this; that the mind has a power, in many cases, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the assistance of this faculty, that we are said to have all those ideas in our understandings which we can bring in sight, and make the objects of our thoughts, without the help of those sensible qualities which first imprinted them there.

Attention and repetition help much to the fixing ideas in our memories: but those which make the deepest and most lasting impressions, are those which are accompanied with pleasure and pain. Ideas but once taken in and never again repeated, are soon lost; as those of colours in such as lost their sight when very young.

The memory of some men is tenacious even to a miracle: but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest; and in minds the most retentive: so that if they be not sometimes renewed, the

print wears out, and at at last there remains nothing to be seen.

Those ideas that are often refreshed by a frequent return of the objects or actions that produce them, fix themselves best in the memory, and remain longest there: such are the original qualities of bodies, *viz.* solidity, extension, figure, motion, &c. and those that almost constantly affect us, as heat and cold.

In memory, the mind is oftentimes more than barely passive; for it often sets itself on work to search some hidden ideas; sometimes they start of their own accord; and sometimes tempestuous passions tumble them out of their cells. This faculty other animals seem to have to a great degree, as well as men, as appears by birds learning of tunes, and their endeavour to hit the notes right. For it seems impossible that they should endeavour to conform their voices (as it is plain they do) to notes whereof they have no idea.

Defect of MEMORY, is a misfortune which may proceed from falls, contusions, passions of the mind, &c. If the memory is much impaired, without any external cause, it is a fore-runner of an apoplexy, and if it proceeds from malignant acute diseases, or poisons, it is incurable.

When the cure is judged practicable, Heister recommends a moderate and strengthening diet, together with carminative, aromatic, cephalic, and stomachic medicines. Spirit of lavender, hungary-water, Hoffman's balsam of life, and sal volatile oleosum, are also proper, used either internally or externally; likewise oil of cinnamon with sugar, native cinnabar, or cinnabar of antimony; but being hot medicines, they should be used with caution. Externally, oil of myrrh should be applied to the temples, and vertex. Cubebs are deemed specific; but young people ought to use them with caution. In old persons, amber should be mixed with the other medicines.

Local MEMORY, among orators, is nothing but the associating the different heads to be handled, with the objects before the speaker's eyes; so that by only looking around him, he is put in mind of what he is to say.

Artificial MEMORY, *memoria technica*, a method of assisting the memory, by forming certain words, the letters of which shall signify the date or æra to be remembered. In order to this, the following series of vowels, diphthongs, and

consonants, together with their corresponding numbers, must be exactly learned; so as to be able at pleasure to form a technical word, that shall stand for any number, or to resolve such a word already formed.

| | | | | | | | | |
|---|---|---|---|----|----|----|----|---|
| a | e | i | u | au | oi | ei | ou | y |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| b | d | t | f | l | s | p | k | n |
| | | | | | | | | z |

The first five vowels, in order, naturally represent 1, 2, 3, 4, 5; the diphthong *au* = 6, as being composed of *a* and *u*, or $1 + 5 = 6$; and for the like reason, *oi* = 7, and *ou* = 9. The diphthong *ei* will easily be remembered for 8, as being the initials of the word. In like manner, where the initial consonants could conveniently be retained, they are made use of to signify the number, as *t* for 3, *f* for 4, *s* for 6, and *n* for 9. The rest were assigned without any particular reason, unless that possibly *p* may be more easily remembered for 7 or septem, *k* for 8, or *ḡurw*, *d* for 2, or duo; *b* for 1, as being the first consonant, and *l* for 5, being the roman letter for 50, than any others that could have been put in their places.

It is farther to be observed, that *z* and *y* being made use of to represent the cypher, where many cyphers meet together, as 1000, 1000000, &c. instead of a repetition of *a z y z y z y*, &c. let *g* stand for 100, *th* for a thousand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oug* 900, &c. *ath* 1000, *am* 1000000, *loum* 59000000. &c.

Fractions may be set down in the following manner; let *r* signify the line separating the numerator and denominator, the first coming *before*, the other *after* it; as *iro* $\frac{3}{4}$, *urp* $\frac{5}{7}$, *pourag* $\frac{79}{100}$, &c. When the numerator is 1 or unit, it need not be expressed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri* $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *rath* $\frac{1}{1000}$.

This is the principal part of the method, which consists in expressing numbers by artificial words. The application to history and chronology is also performed by artificial words. The art herein consists in making such a change in the ending of the name of a place, person, planet, coin, &c. without altering the beginning of it, as shall readily suggest the thing sought, at the same time that the beginning of the word, being preserved, shall be a leading or prompting syllable

syllable to the ending of it so changed. Thus, in order to remember the years in which Cyrus, Alexander, and Julius Cæsar, founded their respective monarchies, the following words may be formed; for Cyrus, *Cyruts*; for Alexander, *Alexita*; for Julius Cæsar, *Julios*. *Uts* signifies, according to the powers assigned to the letters before-mentioned, 536; *ita* is 331, and *os* is 46. Hence it will be easy to remember, that the empire of Cyrus was founded 536 years before Christ, that of Alexander, 331, and that of Julius Cæsar 46. This account is taken from a treatise, entitled, a New method of Artificial Memory; where the reader will find several examples in chronology, geography, &c. of such artificial words disposed in verses, which must be allowed to contribute much to the assistance of the memory, since being once learned, they are seldom or never forgot. However, the author advises his reader to form the words and verses himself, in the manner described above, as he will probably remember these better than those formed by another.

Be this as it will, we shall here give his table of the kings of England since the conquest; where one thousand being added to the italics in each word, expresses the year when they began their reigns. Thus,

Will-consau, Rufkoi, Henrag
Stephbil & Hensecbuf, Richbein, Jann,
Hethdas & Eddoid.

Edsetyp, Edtertep, Risetois, Hefotoun,
Hefiadque.

Hensifed, Edquarfauz, Efi Rokt, Hensep-
feil, Henochyn.

Edsexlos, Marylut, Elsluk, Jamfyd,
Caroprimsel.

Carsecfok, Jamseif, Wilseik, Anpyd,
Geobo-doi.

MEMPHIS, once the capital of Egypt, stood on the west side of the Nile, almost opposite to Grand Cairo.

MENAN, a great river of the further India, which rising north of Siam, runs through that kingdom, and falls into a bay of the Indian ocean below Bancoek.

MENCHOU, a town of France, in the province of Champaign, sixteen miles north-east of Chalons.

MENDELHAM, a market-town of Suffolk, sixteen miles east of Bury.

MENDICANTS, or begging fryars, several orders of religious in popish countries, who having no settled revenues, are supported by the charitable contributions

they receive from others. This sort of fryars began in the thirteenth century; when the Waldenses making a profession of renouncing their estates, and leading a life of poverty, gave rise to this institution. Two of that sect, Bernard and Durand, set up a congregation called the poor catholics; those who afterwards followed their example are, the dominicans, franciscans, augustins and carmelites.

MENDIP, a name given to several hills near the city of Wells, in Somersetshire, in which are lead mines.

MENGRELIA, a province of asiatic Turkey, situated on the north-east part of the Euxine sea, between Georgia and Circassia, where the Turks purchase boys and young women for their seraglios.

MENIALS, in law books, domestic or household-servants, who live under their lord or master's roof.

MENIN, a little fortified town in Flanders, eight miles north of Lisle.

MENINGES, or **MENYNGES**, in anatomy, a name given to the dura and pia mater of the brain. See the article **DURA MATER**, &c.

MENIPPEAN, in poetry, a kind of satyr, consisting of prose and verse intermixed.

MENISCUS, in optics, a lens convex on one side, and concave on the other. See the article **LENS**.

For finding the focus of a meniscus, the rule is: as the difference of the semidiameters of the concavity and convexity, to the semidiameter of the concavity; so is the diameter of the convexity to the focal distance.

MENISPERMUM, **VIRGINIAN IVY**, in botany, a genus of the hexandria-trigynia class of plants, the corolla whereof consists of six ovato-oblong, obtuse, hollow, erecto-patent petals; the fruit is composed of three oval berries, each containing a single cell, and in it a large, single, lunated, compressed seed.

It is to be observed, that the parts of fructification vary extremely in this genus.

MENNONITES, a sect of baptists in Holland, so called from Mennon Simonis of Friezeland, who lived in the sixteenth century. This sect believe, that the New Testament is the only rule of faith; that the terms Person and Trinity are not to be used in speaking of the Father, Son, and Holy Ghost; that the first man was not created perfect; that it is unlawful to swear or to wage war upon any occasion; that infants are not the proper subjects of bap-

baptism; and, that ministers of the gospel ought to receive no salary. They all unite in pleading for toleration in religion, and debar none from their assemblies who lead pious lives, and own the scriptures for the word of God. The mennonites meet privately, and every one in the assembly has the liberty to speak, to expound the scriptures, to pray and sing. They assemble twice every year, from all parts of Holland, at Rynsbourg, a village about two leagues from Leyden, at which time they receive the communion, sitting at a table, where the first distributes to the rest; and all sects are admitted, even the roman catholics if they please to come.

MENOLOGY, the greek calendar, in which the lives of the saints in short, or barely their names, are cited; answering nearly to the martyrology of the latin church. See **MARTYROLOGY**.

MENSA, in law-books, a term that includes in it all patrimony, and necessities for livelihood.

MENSALS, *mensalia*, in church-history, such livings as were formerly united to the tables of religious houses, and hence called menfal benefices. See **BENEFICE**.

MENSES, **FLOURS**, **COURSES**, *catamenia*, in medicine, the monthly evacuations from the uterus of women not with child and not giving suck.

Among the natural actions which prepare proper juices and matter for carrying on the vital motions, may be reckoned this menstrual purgation of women, since by means thereof the superfluous and redundant blood is evacuated, that what remains in the veins may circulate with greater freedom, and be the more effectually depurated. This evacuation is occasioned by the redundance of that fluid in women and the peculiar structure of the uterus; and as it is of great importance to health, so it is the means by which the foetus is nourished. The antient physicians, and the generality of the modern ones, ascribe the periodical return of this flux to the influence of the moon, or to the lunar phases. The quantity of blood thus evacuated cannot be exactly and accurately ascertained, for it varies in women of different ages, methods of life, and constitutions. About the first eruption of the menses the quantity discharged is generally but small. Lean women, and those who abound in blood, evacuate more than such as are fat and of a cold constitution; and those who are

addicted to luxury and idleness, a larger quantity than those who live upon low and slender diet, or use much exercise. The menstrual blood is said to be evacuated both from the minute vessels of the uterus and vagina; it is, however, a great controversy among anatomists, whether this blood is discharged from the veins of the uterus alone, or those of the vagina, exclusive of the uterus. The menses generally make their first eruption in girls about fourteen years of age, and cease between forty and fifty. When this evacuation begins, the body is frequently freed from numberless disorders arising from the redundance of serum before generated; and when it ceases, a large number of disorders are generally produced.

Immoderate flux of the MENSES. Every large flux of blood from the uterus is not to be esteemed noxious, but such only as is attended with loss of strength, which brings on other symptoms, such as want of appetite, crudities from indigestion, a sensation of weight near the region of the stomach, an ill colour in the face, a languid pulse, often with a gentle heat, an oedematous swelling of the feet, and a disturbed sleep without refreshment. Sometimes the menses flow in too great plenty and with impetuosity at the usual period; sometimes twice or oftener in a month; sometimes again they continue several days longer than ordinary. This flux sometimes consists of thin florid blood, which happens chiefly in abortions and from a retention of pieces of the secundines, which keep the mouths of the vessels open; sometimes there are coagulated and clotted masses, like flesh which come away with the blood, of the size of an egg, which is occasioned by a stoppage of the menses for two or three months. At other times the blood is grumous, coagulated and black, generally on the first days of childbed, in slender and plethoric subjects. When the patient is cachectic, and the flux continues long, it is then watry and mucid; in scorbutic persons it is watry and fetid, with acrimony and pain, in the younger sort, before child-bearing; if the evacuation be immoderate, it is commonly followed by a fluor albus.

The cause may be referred to a copious and impetuous afflux of the blood to the uterus, and an unequal and impeded reflux by the veins, which distending and relaxing the uterine vessels, make the ori-

fices too wide, or rend and corrode them, by which the blood flows too freely: this may happen from a plethora, or when there has been a long suppression, or an abortion, or a difficult labour. It generally happens to women about the fiftieth year, when the menses are going to leave them, and not always without danger. If the body is cacochymic, or scorbutic, or full of bad humours, or afflicted with the venereal disease, the case is dangerous and troublesome. It is produced by a sedentary life, by too frequent an use of salt, acrid and seasoned meats, by spirituous liquors, by violent agitations and passions of the mind, from losses, love, anger, &c.

The cure, according to Astruc, should respect the restraining a present flux. It should begin with rest if convenient, in bed; the patient lying on her back and kept as silent as possible: she should be bled in the arm in proportion as her constitution, strength and the urgency of the symptoms will admit. Let her fare slenderly on veal and chicken-broth, fish-soups, and drink a ptisan of nettle-tops, yarrow and plantane, with orange peel, or of the greater comfrey; if the patient is hot and bilious, with linseed. If these fail, let her take twenty-five or thirty grains of roch-alum in substance, with a draught of an astringent decoction. In more desperate cases the uterus may be syringed with a syringe made for that purpose, with a decoction of plantane, red roses, and yarrow, with vinegar or powder of roch alum. If the menses appear in breeding women, the true and only remedy is opium, which must be given freely till the intention is obtained.

Suppression of the MENSES. Boerhaave observes, that in a suppression of the menses there is a plethora, with a listlessness to motion, a heaviness, a paleness, a pain of the loins and of the groin; all the functions, whether natural, vital, or animal, are depraved; sometimes the menses will force a way through the eyes, ears, nostrils, gums, the salival ducts, the oesophagus, from the alvus, bladder, breasts, skin, wounds or ulcers. Hence often arises a depravation of all the viscera, as also diseases without number, partly from a putrefaction already begun, and partly from the hurt which the vessels have received.

From this disorder, Astruc observes, proceed want of appetite, the mica malacia,

or a depraved appetite. If it is habitual and obstinate, a schirrus or dropsy of the womb are to be feared, or a rupture of some blood-vessel, especially of the lungs. It is not so dangerous when the uterus is not infarcted, or when there is no other symptom of the menses. If this disease is attended with the fluor albus, it may become habitual, and from yellow become green and acrid, corroding the uterus, and laying the foundation of a dropsy therein.

Things which retard the menses are immoderate cold, sorrow, a sudden fright, too great evacuations, incrassating diet, a crudity of the humours, acids, and astringent medicines.

This disorder, according to Sydenham, is to be cured in the same manner as the hysteric affection, but if the remedies for that fail, the patient must take every morning five spoonfuls of hysteric julep with twelve drops of spirit of hartshorn; and every night one scruple of powder of myrrh camphorated, made into a bolus or pills with the syrup of orange-peels. Allen recommends cantharides and camphor: the dose is from two grains to six. Hoffman directs chalybeats, or pills made of aloes, myrrh, saffron, amber, castor, and round birthwort. Pitcairn thinks mercury more efficacious than steel. If the fluids are inclinable to stagnate, their fluidity may be preserved by fomentations and frictions of the feet, by opening a vein in the foot, and bleeding elsewhere, by giving uterine purges, by emmenagogues, by plasters, fomentations, liniments, vapours and heat, by strengthening the vessels debilitated with a plethora by chalybeats and astringents. See the articles FOMENTATION, FRICTION, EMMENAGOGUES, LINIMENT, &c.

MENSTRUUM, in chemistry, any body which in a fluid or subtilised state is capable of interposing its small parts betwixt the small parts of other bodies, so as to divide them subtilly, and form a new uniform compound of the two. Hence chemists have divided menstrooms into solid and fluid. Dry or solid menstrooms may again be divided into five classes; which, according to Boerhaave, are as follow. 1. The fix metals, gold, lead, silver, copper, iron and tin, which act upon one another after being fused in the fire, and may be intimately mixed, so as to make an apparently homogeneous mass, every particle of which holds the same proportion

tion of a different metal as the whole. For if ten ounces of silver be thus mixed with an ounce of gold, and a grain of this mass be given to an assay-master, he will discover that it contains one eleventh part gold and ten parts silver. 2. The semi-metals, as antimony, bismuth, cinnabar, marcasites and zink, which, when melted, mix with one another or with metals; but when thus mixed they are no longer malleable, but may easily be reduced to powder. 3. The dry salts, as alum, borax, nitre, sal-ammoniac, sea-salt, vitriol, fixed alkali, and mercury-sublimate, which may be subtilly divided by fire, and intimately mix with one another, with metals, semi-metals, and other things. 4. Hard fossil sulphureous bodies, as sulphur vivum, common brimstone, arsenic, orpiment and cobalt. 5. The fossil bodies, called by refiners cements, which consist of salts, sulphur and brick reduced to dry powders and strowed betwixt plates of metals, in order to raise their colour, or separate one metal from another.

Some menstrua being left to themselves, after solution concrete into an hard mass, which, though compounded, appears of an uniform simple nature. In this manner, if melted lead be mixed with tin, they unite, as water with water, or mercury with mercury. The case is the same in all the metals, and in some of the semi-metals. Thus if a scruple of regulus of antimony be added to a pound of melted tin, the mass when cold will appear uniform, but become entirely brittle: so fixed alkali unites with sand in the fire; and sulphur and mercury, by being ground together, turn to a black and dry powder, which being sublimed produces an apparent simple body called cinnabar. Many become an hard, and sometimes a dry body. Thus almost all the menstrua of metals unite with their respective metals into solid vitriols: and thus strong distilled vinegar, when it has dissolved shells, chalk, and stony substances, separates from its water, and together with the body it dissolves, forms a dry hard mass. See SOLUTION.

Numerous menstrua have a liquid form before they act as solvents; as vinegar, water, saline, acid, alkaline and compounded spirits, alkaline oils per deliquium, &c. some menstrua become liquid after the solution, and continue so with the solvent. Thus in the dissolution

of five of the metals with simple mercury a soft paste is produced, which may indefinitely be diluted by the addition of more mercury, but there is scarcely any known method of restoring this amalgama to its solidity. All the liquid menstrua, after having dissolved metals in a large proportion, cannot easily be dried; whence many have imagined these solutions to be fixed metallic oils, and in vain sought secrets in them.

It is now easy to observe that many menstrua unite bodies as well as separate them; for frequently after the dissolution the particles of the menstruum presently join with those of the solvent, and produce a new compound, often very different from the nature of the simple resolved body. The parts however of the solvent, after its concretion, no longer touch one another, but are separated by the interposition of the particles of the matter dissolved. And the particles which before constituted the solvend are separated by the interposition of the particles of the solvent. Hence it is plain that the parts of the menstrua apply themselves to the parts of the solvend; and a certain cause is here required to make the particles of the solvent fly from one another and approach the particles of the solvend, rather than remain in their former situation. The like cause seems to be required to make the particles of the solvend, now separated, remain united with the parts of the menstruum, rather than suffer the dissolving and dissolved particles to unite by their natural affinity into homogeneous bodies. This cause must be sought in the solvend as well as in the solvent, for the action is reciprocal. Thus while aqua regia dissolves thrice its weight of gold into a yellow liquor, the particles of gold are united with the aqua regia, and remain suspended in it, though gold be eighteen times heavier than aqua regia. Whence there must be a mutual corresponding power between the particles of the gold and aqua regia, whereby they act upon, embrace and detain each other, otherwise the particles of gold would fall to the bottom, the saline particles rest upon them, and the water float over both. If we were to deduce the cause from similitude of substance, the action of dissolution seems to be performed by a certain power of the parts of the menstruum to attract the dissolved parts rather than to repel them; and is not a me-

chanical action, or unfriendly commotion, but rather an appetite of union. Thus, in a violent solution, the agitation, heat, hissing and tumult cease when all the parts of the solvend have united with those of the solvent, as appears in throwing a piece of iron into weak aqua fortis.

The whole solvent never acts at once on the whole solvend, only those particles of the solvend which touch some others of the solvent act first; and these being separated, fresh particles of the menstruum apply themselves to others of the solvend: therefore part of the menstruum acts upon that part of the body which it strikes off and separates, but the conflict made in this separation excites a greater motion in the menstruum, by which means other parts of the menstrooms are agitated and applied to other parts of the solvend.

Fire excites, promotes, and increases the action of menstrooms; for in extreme cold, solutions are either not made or made but slowly, but they are soon performed by the assistance of heat: some menstrooms require a strong heat, as mercury, before it will dissolve metals: some a smaller; thus sal armoniac, sea salt, and salt of tartar easily dissolve in water: some menstrooms act with a moderate heat, but lose their dissolving power, or even acquire a power of coagulating, by a stronger; thus warm water dissolves the white of eggs, which boiling water coagulates. This effect of fire seems to be produced, 1. by impelling, moving and agitating the menstruum in the manner of a mere mechanical motion. 2. By its general power of expanding the substance of all bodies. 3. By separating the parts so as to set them farther asunder. In most cases the heat is increased during the solution, and even the action of those menstrooms is augmented by heat, which generate a great degree of cold in the solution; thus sal ammoniac dissolves soonest in warm water.

The above being part of the doctrine of Boerhaave concerning menstrooms, we shall subjoin the following axioms and canons in relation to the same subject from Dr. Shaw's chemical lectures.

That author having derived these axioms from experiments, thence deduces the canons in the manner following. 1.

That water is a menstruum which of itself dissolves little more than salts, but being assisted by acids, dissolves earths,

and even metals themselves. See the article ACID *menstrooms*.

Hence a general rule of practice might be drawn for making water an almost universal menstruum; thus, by the addition of a fixed alkaline salt, it dissolves oil into a soap; by the addition of alcohol, it extracts the resinous tinctures of vegetables; and in this manner it might be proper to run through the different subjects of the vegetable, animal and mineral kingdoms, and form tables of the solutive powers of water, separate, and in conjunction. 2. That such tables may be readily formed of the dissolving power of all known menstrooms, to shew, by inspection, in what time, in what proportion, and with what degree of heat all solvents perform their actions; which being once reduced to a certainty, would greatly facilitate and improve the practice of chemistry. 3. That the power of alcohol, as a menstruum, is chiefly limited to resins and oils, but by certain additions may be extended, as was said of water, so as to become an almost universal solvent. Thus, by the addition of water, it becomes brandy, or spirit which extracts many tinctures that pure water and pure alcohol will not separately extract. Whence we have a good instruction for attempting a new set of menstrooms by mixture, or the composition of two or three simple solvents: and if the requisite care and skill were employed in this matter, many useful discoveries might be justly expected from it. Indeed the mixing of two menstrooms may sometimes destroy the virtue of both: thus spirit of nitre and simple water will each of them separately dissolve the calculus humanus, but not touch it when they are mixed: but this instance is only particular, and there are a large number producible on the contrary side, which may rationally recommend a further prosecution of this enquiry. 4. That metals are soluble in oils and acid spirits, so as not to be easily discovered therein: whence a rule may be drawn for a prudent suspension of the judgment, and a rational distrust of the senses, in chemical operations; and again, a caution derived against being imposed on by vain pretences of alchymists. 5. That the power of a menstruum is not to be judged of by its innocency with regard to the animal body; the acid spirit of bread is innocent and wholesome, yet capable of dissolving coral and gems. Pure oil-olive will

will dissolve lead and tin. The white of an egg boiled hard, and suffered to run *per aquilum*, dissolves the tough body of myrrh. 6. That the action of menstrua depends upon a certain secret and reciprocal relation betwixt the solvent and solvend, scarce cognizable by the direct senses, nor hitherto well made out by instances and induction. 7. That menstrua have not their full action unless reduced to a fluid or subtile state. Water in the firm and solid form of ice, does not act on salts, but they soon begin to dissolve each other upon contact. Metals do not act upon metals in the way of solution till they are fused; nor does sulphur dissolve quicksilver till they are both reduced either to a fluid or very subtile state by triture or melting; whence to promote the actions of menstrua, we are directed to reduce both the solvent and solvend to minute parts, or the nearest possible to a fluid state, whether by heat, triture, fusion, or otherwise. 8. That quicksilver is a true solvent of metals, so as to drink them in as water drinks in salts; by which means one metal may be readily united with another in any proportion by simple triture; and by this means, amalgamation and many operations in the sublimer metallurgy are performed. 9. That acid spirits are not equally proper menstrua to all the metals: thus spirit of nitre, though it dissolves the rest, will not dissolve gold. 10. That all bodies in nature may become menstrua to one another, each of them being, by some means or other, capable of having their parts uniformly interposed betwixt the small parts of any of the rest; thus even metals may, by art, be made to dissolve in water, as we evidently see from numerous solutions of metals in acid spirits: these spirits being no more than water charged with the fine or more volatile parts of salts. 11. That the cause commonly assigned of solution, *viz.* the admission of the fine particles of one body into the pores of another, whose figure fits them for their reception, is not just or adequate, but hypothetical and ill presumed; since we find that some bodies will uniformly dissolve their own quantity of others, as water does of Epsom-salt, alcohol of essential oils, mercury of metals, one metal of another, &c. whereas the sum of the pores or vacuities of every body, must be necessarily less than the body itself, and consequently those pores can-

not receive a quantity of matter equal to the body wherein they reside. 12. That the dissolving power of water may be immensely increased by means of the digester, from which instrument there are solid grounds of hope that it may, under a proper regulation, greatly contribute to the improvement of chemistry, natural philosophy, and arts. See the article **DIGESTOR**.

13. Upon the whole, it should seem that many desirable improvements are derivable to arts from an improvement in the business of menstrua. The discovery of that common menstruum aqua fortis, introduced the art of assaying, and the scarlet-dye. That of alcohol introduced the arts of varnishing and japaning. Numerous pigments for painters, colours for dyers, tan-liquors for tanners, the staining of bone, horn, ivory, marble, various kinds of ink, tinctures, and solutions in medicine, chemistry, and other arts, have all resulted from the discovery of menstrua; yet this subject seems almost as new and rich as ever, so that numerous other discoveries of the same kind could not exhaust it.

Universal MENSTRUUM. See the article **ALKAHEST**.

MENSURATION, in general, denotes the act or art of measuring lines, superficies, or solids. See **DISTANCE**, **GAUGING**, **HEIGHT**, **SURVEYING**, &c.

MENTHA, **MINT**, in botany. See the article **MINT**.

MENTZ, the capital of one of the electorates of the same name in Germany, situated at the confluence of the rivers Rhine and Maine: east long. 8°, and north lat. 50°.

MENTZELIA, in botany, a genus of the polyandria-monogynia class of plants, the flower of which consists of five patent petals: the fruit is an oblong, unilocular capsule, containing a number of small roundish seeds.

MENYANTHES, **BUCKBEAN**, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous funnel-like flower, divided into five deep segments at the limb: the fruit is an oval capsule with one cell, containing a great many small seeds.

Buckbean, called by authors *trifolium palustre* and *paludosum*, and by Tournefort *nymphoides*, is greatly recommended as a diuretic, in dropical cases; as also in the cure of intermittent fevers, and disorders of the breast arising from
tough

tough matter in the lungs: the general way of taking it is in a strong infusion, though many prefer the juice fresh expressed from the leaves.

MEOTIS, or **PALUS MEOTIS**, a sea of Turkey, which divides Europe from Asia, extending from Cim Tartary to the mouth of the river Don, or Tanais.

MEPPEN, a city of Germany, in the circle of Westphalia, and bishopric of Munster: east long. 7° , north lat. $52^{\circ} 55'$.

MEQUENENCA, a city of Spain, in the province of Arragon, fifty miles south-east of Saragossa.

MEQUINEZ, a city of Fez, in the empire of Morocco: west long. 6° , north lat. 34° .

MERAN, or **MORAN**, a city in the circle of Austria and county of Tyrol: east long. $11^{\circ} 15'$, north lat. $46^{\circ} 40'$.

MERCATOR'S SAILING, that performed by Mercator's chart. See the articles **CHART** and **NAVIGATION**.

MERCATOR'S projection of maps. See the article **MAP**.

MERCHANT, a person who buys and sells commodities in gross, or deals in exchanges; or that traffics in the way of commerce, either by importation or exportation. Formerly every one who was a buyer or seller in the retail way, was called a merchant, as they are still both in France and Holland; but here shopkeepers, or those who attend fairs or markets, have lost that appellation.

Previous to a person's engaging in a general trade, and becoming an universal dealer, he ought to treasure up such a fund of useful knowledge, as will enable him to carry it on with ease to himself, and without risking such losses as great ill-concerted undertakings would naturally expose him to. A merchant should therefore be acquainted with the following parts of commercial learning: 1. He should write properly and correctly. 2. Understand all the rules of arithmetic that have any relation to commerce. 3. Know how to keep books of double and single entry, as journals, a ledger, &c. 4. Be expert in the forms of invoices, accounts of sales, policies of insurance, charter-parties, bills of lading, and bills of exchange. 5. Know the agreement between the money, weights and measures of all parts. 6. If he deals in silk, woollen, linen, or hair manufactures, he ought to know the places where the different sorts of merchandizes are manufactured, in what manner they are

made, what are the materials of which they are composed, and from whence they come, the preparations of these materials before working up, and the places to which they are sent after their fabrication. 7. He ought to know the lengths and breadths which silk, woollen, or hair-stuffs, linen, cottons, fustians, &c. ought to have according to the several statutes and regulations of the places where they are manufactured, with their different prices, according to the times and seasons; and if he can add to his knowledge the different dyes and ingredients which form the various colours, it will not be useless. 8. If he confines his trade to that of oils, wines, &c. he ought to inform himself particularly of the appearances of the succeeding crops, in order to regulate his disposing of what he has on hand; and to learn as exactly as he can, what they have produced when got in, for his direction in making the necessary purchases and engagements. 9. He ought to be acquainted with the sorts of merchandize found more in one country than another, those which are scarce, their different species and qualities, and the properest method for bringing them to a good market, either by land or sea. 10. To know which are the merchandizes permitted or prohibited, as well on entering as going out of the kingdoms or states where they are made. 11. To be acquainted with the price of exchange, according to the course of different places, and what is the cause of its rise and fall. 12. To know the customs due on importation or exportation of merchandizes, according to the usage, the tariffs, and regulations of the places to which he trades. 13. To know the best manner of folding up, embalming, or tunning the merchandizes for their preservation. 14. To understand the price and condition of freighting and insuring ships and merchandize. 15. To be acquainted with the goodness and value of all necessaries for the construction and repairs of shipping, the different manner of their building, what the wood, the masts, cordage, cannons, sails, and all requisites may cost. 16. To know the wages commonly given to the captains, officers, and sailors, and the manner of engaging with them. 17. He ought to understand the foreign languages, or at least as many of them as he can attain to; these may be reduced to four; *viz.* the Spanish,

Spanish, which is used not only in Spain, but on the coast of Africa, from the Canaries to the Cape of Good Hope: the Italian, which is understood on all the coasts of the Mediterranean, and in many parts of the Levant: the German, which is understood in almost all the northern countries; and the French, which is now become almost universally current. 18.

He ought to be acquainted with the consular jurisdiction, with the laws, customs, and usages of the different countries he does or may trade to; and in general all the ordinances and regulations, both at home and abroad, that have any relation to commerce. 19. Though it is not necessary for a merchant to be very learned, it is proper that he should know something of history, particularly that of his own country, geography, hydrography, or the science of navigation; and that he is acquainted with the discoveries of the countries in which trade is established, in what manner it is settled, of the companies formed to support those establishments, and of the colonies they have sent out.

All these branches of knowledge are of great service to a merchant who carries on an extensive commerce; but if his trade and his views are more limited, his learning and knowledge may be so too: but a material requisite for forming a merchant is, his having on all occasions a strict regard to truth, and his avoiding fraud and deceit as corroding cankers that must inevitably destroy his reputation and fortune.

Trade is a thing of so universal a nature, that it is impossible for the laws of England, or of any other nation, to determine all the affairs relating to it; therefore all nations, as well as Great Britain, shew a particular regard to the law-merchant, which is a law made by the merchants among themselves: however, merchants and other strangers are subject to the laws of the country in which they reside. Foreign merchants are to sell their merchandize at the port where they land, in gross, and not by retail; and they are allowed to be paid in gold or silver-bullion, in foreign coin or jewels, which may be exported. If a difference arises between the king and any foreign state, the merchants of that state are allowed six months time to sell their effects and leave the kingdom, during which time they are to remain free and unmolested in their goods. See the articles

COMMERCE and NAVAL AFFAIRS. MERCURIAL, something consisting of or relating to mercury. See MERCURY.

The efficacy of mercurial medicines depends on the extreme fineness and great weight of their particles, whereby they penetrate into the inmost recesses of the animal structure, and there remove obstructions. However, as they tend to quicken the circulation of the blood, their use in hectic cases seems dangerous.

MERCURIALIS, MERCURY, in botany, a genus of the dioecia-ennendria class of plants, with an apetalous flower, consisting only of stamina: the fruit is a large bilocular capsule, with a single roundish seed in each cell.

MERCURIFICATION, in chemistry, the method of separating the mercuries of metals, which is most easily effected by means of a burning-glass; for the metal being placed in its focus, its mercurial parts are said to fly off in smoke, which when condensed and collected, appears to be true quicksilver.

MERCURY, in natural history, a semi-metal naturally fluid, and the heaviest of all known bodies except gold: it is so perfectly homogeneous and simple in its nature, that it is a question whether gold itself be more so: when perfectly purified, it appears the same in all its parts, as far as our utmost tests can go, till we come to that severe trial, the solar fire. It penetrates the parts of all the other metals, renders them brittle, and in part dissolves them. It is wholly volatile in the fire, and may be driven up in vapour by a degree of heat very little greater than that of boiling water. It is the least tenacious of all known bodies, for its parts separate into more minute ones of the same figure, with the smallest force. It is, indeed, the most divisible of all bodies, for the vapour, in form of which it rises in evaporation, is almost too thin to be distinguished from the ambient air, yet this is pure unaltered mercury; for if it is received into cold water, it forms itself again into regular round drops. Notwithstanding a small heat serves to evaporate mercury, yet if it be kept in a degree smaller than that, in a vessel carefully closed, a long continuance of that heat will reduce it to a red calx in form of powder, and this may be again revived into fluid mercury by a gentle heat given it in stratification with charcoal-dust. If it be placed in its crude state in the focus of a great burning-glass,

glass, it is immediately dissipated in fumes, and leaves no remainder: but if instead of crude mercury, this red calx be used, it runs into a kind of glass, and immediately afterwards evaporates, leaving a small quantity of dusky powder behind, which, on being further urged by the same intense heat, vitrifies and flies off as the other part had done: but if this calx be exposed upon a piece of charcoal, the effect is the same, as in giving it the heat of a common fire with charcoal-dust, it runs into liquid mercury, and immediately afterwards evaporates. It appears, therefore, that mercury, simple as it seems to be, is composed of a vitrifiable earth, and a sulphur, which last gives it the brightness and appearance of metal; for when robbed of this, it ceases to be bright and metalline, and again recovers those qualities on its being added again, tho' from no other substance than charcoal. It is possible to calcine mercury to such a degree, that it shall bear heating red hot in a crucible without evaporation. The penetrating power of mercury is so great, that in salivations any thing of gold worn by the persons, will be amalgamated with the fumes of it passing thro' the skin, and will be rendered white and soft by it.

It dissolves very readily in the stronger acid menstrua, and what is very singular, in aqua fortis and aqua regia indifferently, while the other metals in general that are soluble in one of these, are not to be affected by the other. With oil of vitriol, it yields us the yellow emetic powder called turbith mineral; and with spirit of sea-salt, corrosive sublimate. The specific gravity of pure mercury is to water as 14020 to 1000; and as it is the heaviest of all fluids, it is also the coldest: common water is much more cold to the touch, under the same circumstances, than spirit of wine, and consequently, mercury than either; and when heated, mercury is in an equal degree the hottest of all fluids; that heat, which given to water would scarce be felt by the flesh, will burn it if given to mercury.

Mercury readily mixes with gold, silver, lead and tin, among the metals, and with zink and bismuth, among the semi-metals. See AMALGAMATION.

But notwithstanding this, it does not easily blend with any other substance, except by the means of fire, or of trituration: by either of these methods, it may be

blended intimately with sulphur; by the former, into a red matter; by the latter, into a black powder, called æthiops mineral. See ÆTHIOPS MINERAL.

No drug ought to be so carefully examined as to its purity as mercury, as none is so frequently sophisticated. The weighing it hydrostatically is the surest of all means to find out this adulteration; or it may be discovered by evaporating a little of it, to try if any thing will remain behind: or when it is adulterated in the common way with lead, by grinding it in a mortar with vinegar. This mild acid is a menstruum for lead, though not for mercury, and consequently if there has been lead mixed among the mercury, it will grow sweet to the taste, but if the mercury be pure, it will remain unaltered.

The ores of mercury are of various kinds, but the most general one is known by the name of cinnabar, which very readily parts with its quicksilver, on its being distilled in a glass retort, with the addition of quick-lime or iron-filings. In many places it is separated by burying certain earthen vessels in the earth, and inverting into them others containing cinnabar, and stopped with a bundle of moss; when a fire being made about these, the quicksilver runs through the moss, and is saved in the under vessel. The sulphur is not so easily separated from this mineral in its proper form, but if it be boiled in a strong lixivium of wood-ashes, and distilled vinegar be added to the clear liquor, it will be precipitated. For the properties and virtues of native and factitious cinnabar, see the article CINNABAR.

Mercury is not only found in cinnabar, and other ores, but is sometimes met with in its pure and fluid state, lodged in the accidental cavities of hard stone, for when the workmen who search for its ore accidentally break into these cavities, it runs out like water. The unhappy creatures who work in these mines seldom live more than three or four years, and then die in a most miserable manner; and the people who work it in any other manner in abundance, and for a constancy, are as certain of mischief from it, being always afflicted with palsies and tremblings of the limbs. We have also had abundant experience from the common mercurial unguents, and from the method of taking it internally, that when proper care has not been taken, the

the nerves have frequently been terribly hurt by it, the humours colliquated, and beside the common symptoms of a ptyalism, ulcers of the mouth and throat, and diarrhoeas of the most dangerous kind, have been brought on.

However, under proper regulations, it is a most powerful and noble medicine. Its virtues in opening the obstructed passages, and in attenuating tough and viscid humours in the very remotest parts of the body, are superior to those of almost any other medicine. Whence it is found of great use in stoppages of the glands, in schirrosities of the spleen and mesentery, and in strumous and scrophulous cases. It is also well known to be superior to any thing in the itch, and other cutaneous eruptions of the most malignant kind, and also in venereal ulcers.

On its being imported it pays a duty of $6\frac{97\frac{1}{2}}{100}$ d. the pound, and draws back on

exportation $6\frac{12}{100}$ d.

Crude mercury is best prepared for internal use by distilling it in a retort; and a good method of giving it in small doses, is the rubbing it with fine sugar in a mortar, with a small proportion of oil of almonds, till it is perfectly blended with the sugar.

Crude mercury is an ingredient in many of the ointments and plasters of the shops, and is frequently ordered in extemporaneous prescriptions. In this case the common method of giving it is in the form of pills, in which it is killed with turpentine, and mixed with other ingredients principally of the purging kind.

Preparations of MERCURY, now in use in the shops, are chiefly these, 1. æthiops mineral: 2. factitious cinnabar: turbith mineral: 4. white precipitate: 5. corrosive mercury sublimate: 6. mercurius calcinatus, commonly called precipitate per se: 7. red mercurial corrosive: 8. coralline mercury: and, 9. mercurius dulcis.

For the manner of preparing the four first of these, see *ÆTHIOPS MINERAL*, *CINNABAR*, &c.

Corrosive mercury sublimate, or white corrosive mercury, is prepared in the following manner: take of purified mercury, forty ounces; of sea-salt, thirty-three ounces; of nitre, twenty-eight ounces, and of calcined green vitriol, sixty-three ounces. Rub the quicksilver

first in an ounce or more of corrosive sublimate, in a wooden or stone-vessel, till it be broken into small grains; then mix with it the nitre, afterwards the sea-salt, till the mercury quite disappears; lastly, add the calcined vitriol, but do not rub the mixture too long with it, lest the quicksilver should begin to part again; put the whole into a matrafs with an alembic-head, and sublime it. The corrosive sublimate will be found in the head, and a spirit in a small quantity will run into the receiver. This is a terrible poison, and corrodes every part it touches as it goes down into the stomach; it is therefore only used externally, for eating down proud flesh, and cleansing old and foul ulcers. Mercurius calcinatus, or calcined mercury, commonly called precipitate per se, is thus prepared: set purified mercury upon a sand-heat for several months, in a glass-vessel with a broad bottom, and a small aperture to let in the air, till it be reduced to a red powder. This preparation is in great esteem in all cases in which mercurials are proper: two or three grains are generally given for a dose. Red mercurial corrosive, improperly called red precipitate, is thus prepared: take any quantity of purified mercury, put it into a flat-bottomed glass, and add to it an equal quantity in weight of aqua fortis: let the mixture in a sand-heat till all the moisture is evaporated, and the mass at bottom has acquired a fine red colour. This is a mild escharotic, and is used in eating down carnosities and proud flesh in ulcers, which it performs with very little pain. Coralline mercury, or arcanum corallinum, is thus prepared: pour upon the mercurial red corrosive thrice its weight of rectified spirit of wine, and digest them together two or three days in a gentle heat, often shaking the vessel: then set fire to the spirit, stirring the powder continually till the spirit is quite burnt away. This powder is given in small doses of two or three grains. For the manner of preparing mercurius dulcis, also called draco mitigatus, aquila alba, and calomel. See *CALOMEL*.

Animated MERCURY. See *ANIMATED MERCURY*, &c. in astronomy, the smallest of the planets, and the nearest the sun. See the article *COPERNICAN*.

Its mean distance from the sun is 387 of such parts of which the earth is 1000, its excentricity is 80 of such parts. The inclination of its orbit is $6^{\circ} 54'$;

performs its revolution round the sun in 87 days, 23 hours, 16'; its greatest elongation is about $22^{\circ} 46'$. The place in the elliptic for the ascending node is in $14^{\circ} 42'$ of taurus. Its diameter to that of the earth is as 3 to 4: and therefore the globe of mercury will be to that of the earth as 2 to 5.

Mercury, in the same manner as venus, always keeps himself in the neighbourhood of the sun, and never recedes from him so far as venus does; he hides himself so much in the splendor of the sun's rays, that he is but seldom seen by us on the earth; but since the invention of telescopes, he has been frequently observed, when in conjunction with the sun, to pass under his disk like a black spot. The exceeding brightness by which mercury outshines all the planets, does evidently prove him to be much nearer the sun than any of the rest; for the nearer any body is to the sun, the greater illustration it receives from him. From all this it is evident, that mercury does likewise go round the sun in a lesser orbit, included within the orbit of venus. See the article VENUS.

Again, whatever is demonstrated concerning the motions of venus, is likewise true, and to be understood of the motions of mercury; but the conjunctions of mercury with the sun, his directions, stations, and retrogradations, are more frequent than in venus; for mercury circulating faster, and in a lesser orbit than venus, does oftner overtake the earth than she. Hence it is plain, that the motions of these two planets seen from the earth, are very irregular and unequal, since they are sometimes seen to have a motion forward; sometimes they appear immoveable, or stationary, after this they change their course, and move backwards, and after such a regression they again take up their stations, and keep for some time the same place in the zodiac: whereas a spectator in the sun will always observe these planets to go forward with a motion regulated after a certain rate; for the apparent inequality of these motions, seen from the earth, is such as exactly answers to a regular motion round the sun: and therefore it is manifest that the sun, and not the earth, is the center of these planets motions.

Dr. Halley, in his observation of mercury, seen in the sun, A. D. 1677, at St. Helena, says, that this planet may be seen nine times in the sun, near the

ascending node, A. D. 1710, 1723, 1736, 1743, 1756, 1769, 1776, 1782, 1789, in October, and four times near the other node, in the month of April, A. D. 1707, 1753, 1786, 1799; all in this century.

Dr. Gregory, in his elements of astronomy, describes the phænomena that will appear to the eye in mercury: he says, that besides the phænomena of the order of the fixed stars, which agree alike with an eye placed any where within the orbit of saturn, it is plain that the eye, posited in mercury, will see the sun almost three times broader than we see it from the earth, because that planet is almost three times nearer to the sun than the earth. Whence also the solar disk, seen from mercury, is seven times greater than the disk as it appears to us, and mercury has seven times more light and heat, *cæteris paribus*, than the earth. But these qualities are much more or less intense, according to the different distance of mercury from the sun; for its orbit is much more excentric, than the orbit of any other planet.

The accelerating gravity, towards the sun, is also seven times greater there than here.

It has not yet been found by observation, whether mercury turns upon its own axis, and therefore it cannot be certainly defined, whether to an eye, placed on its surface, all the things without will appear to revolve with a contrary motion; that is, whether it has the vicissitude of day and night, much less what is the space of its nychthemeron, or natural day: but we may safely enough conjecture, that it does revolve about its axis, since other planets do. But the year of mercury is scarce equal to a quarter of our year, tho' it is uncertain whether it has different seasons, because they depend upon the inclination of the axis of its rotation, which is unknown, to the plane of the orbit which it describes about the sun. The eye placed in mercury, looking at the sun, will see the sun's spots (when it has any) sometimes in a right line crossing his disk from east to west, at another time their way will appear elliptical and curved, towards one side or the other, and all the variety of this phænomenon will happen in one year, in which the track or way of the spots will appear twice rectilinear. But the way of the solar spots, seen from mercury, will be always almost straight; because mercury never declines much from

from the plane of the sun's equator, and therefore not sensibly from the planes of the circles, which the spots describe by their rotation. And as the plane of the orbit of the earth is most of all inclined to the said plane of the sun's equator, the way of the spots, seen from the earth, appears more curved than if the sun was seen from any other planet. This curvature will be something less, seen from jupiter or mars; and yet less from saturn, less still from venus, and least of all from mercury, as we have just observed.

The other five planets are superior to mercury, therefore their phænomena are to an eye placed in mercury, as the phænomena of mars, jupiter and saturn, seen from the earth. Therefore venus and the earth, when they are in opposition with the sun, will shine with a full orb, and reflecting the sun's rays very directly, will shine upon mercury all night, and powerfully expel the darkness. For since venus, when it is horned, and shews the least part of its enlightened hemisphere to the inhabitants of the earth, is so bright as to cast a shadow, it will appear very bright to mercury, to which it turns its whole enlightened hemisphere.

Mercury sees no inferior planet known to us, consequently sees no celestial body falcated or horned; and therefore a spectator there, will want the argument taken from such phases of the planets, to establish the true system of the world; for the phases of the inferior planets have clearly shewn that they moved about the sun; whence it was natural to think the same of the other motions. But nevertheless, tho' we do not see any planets inferior to mercury, it does by no means follow that there are no such: for mercury himself is seldom seen in our oblique sphere, and one that should be much inferior to it would never be seen, upon account of its nearness to the sun.

MERCURY, in heraldry, a term used, in blazoning by planets, for the purple colour, in the arms of sovereign princes. See the article BLAZONING.

MERCURY, in matters of literature, denotes a book, or other paper, chiefly filled with news; so called from the pagan deity Mercury, who is said to have been the messenger of the gods. Hence also the persons employed to collect news; or distribute the news papers, are called mercuries.

MERCY, *misericordia*, in law. See the article MISERICORDIA.

MERCY-SEAT, or PROPITIATORY, in jewish antiquity. See PROPITIATORY.

MERGANSER, in ornithology, a species of mergus. See the next article.

MERGUS, in ornithology, a genus of birds, of the order of the anseres, distinguished by having the beak of a cylindrical figure, and hooked at the extremity, and its denticulations of a subulated form.

To this genus belongs the merganser, with a hanging crest, a bluish-black head, and a circle of white round the neck: the male and female, however, are so very unlike, that they have got distinct english names; the former being called goosander, and the latter the dundiver, or spurling fowl. There are several other species, distinguished by their different colours.

MERIDIAN, in astronomy, a great circle passing through the poles of the world, and both the zenith and nadir, crosseth the equinoctial at right angles, and divideth the sphere into two hemispheres, the eastern and western: it has its poles in the east and west points of the horizon. It is called meridian, because when the sun cometh to the south part of this circle, it is then mid-day; and then the sun has his greatest altitude for that day. These meridians are various, and change according to the longitudes of places; so that they may be said to be infinite in number, for all places from east to west have their several meridians: but there is (or should be) one fixed, which is called the first meridian. Ptolemy chose to make that the first meridian which passes near the Fortunate islands, at about the distance of one degree from them; and reckons from thence to the east thro' Africa and Asia; choosing to begin at a place inhabited, and which was then the bounds and limits of the known part of the earth to the west, and to end at the eastern shore of Scain in Asia; but America being discovered not many ages ago, and long after Ptolemy's time, the first meridian was removed more to the west. Some made that the first meridian which passes through the isle of St. Nicholas, which is one of those near Cape Verd; and Hondius chose the isle of St. James to be the first in his maps.

Others chose that which passes through the isle del Corvo, one of the Azores,

because the needle was found not to decline from the north there and in the adjacent seas, but to lie in the meridian line; and this beginning Mercator chooses. But seeing there are other places where the needle points to the north, and it doth not so in every part of that meridian, geographers thought this not a sufficient reason; some fixing it at the shore of Brasil, that runs out into the sea. Later geographers choose to begin at the mountain Teneriff, in the Fortunate or Canary islands, which is counted one of the highest on the earth; and the rather because they thought some remarkable place should be chosen that might be most known to future ages; and so Ptolemy's first meridian, though long observed, was not laid aside without good reason. The French, since the year 1634, have taken that which goes through the west part of the isle of Fero, one of the Canaries. Astronomers also have taken divers places for the first meridian; the followers of Tycho fix it at Uraniburg, an island in the danish streights, and calculate the celestial motions to that place, and from thence accommodate them to the rest. Others choose other places, according to the authors of the ephemeris they use, who calculate the ephemeris, and the planets places for the meridian of their own place. As Riccioli, who fixed his first meridian at Bologna; Mr. Flamsteed, at the royal observatory at Greenwich; and the French, at the observatory at Paris. See OBSERVATORY.

But without regard to any of these rules, our geographers and map-makers frequently assume the meridian of the place, or the capital of the country, for the first meridian; and thence reckon the longitudes of their places.

In the Philosophical Transactions, there is a suggestion that the meridians vary in time. This seems very probable, from the old meridian line in the church of St. Petronio at Bologna, which is found to vary no less than eight degrees from the true meridian of that place at this time; and from that of Tycho Brahe at Uraniburg, which M. Picart observes varies eighteen minutes from the modern meridian. If there be any thing of truth in this hint, Dr. Wallis says, the change must arise from a change of the terrestrial poles (here on earth, of the earth's diurnal motion) not of their pointing to this or that of the fixed stars; for if the

poles of the diurnal motion remain fixed to the same place on the earth, the meridians which pass through these poles must be the same.

But this notion of the changes of the meridian, seems overthrown by an observation of M. Chazelles, of the french academy of sciences, who, when in Egypt, found that the four sides of a Pyramid built 3000 years ago, still looked very exactly to the four cardinal points; a position, which could never be looked on as fortuitous.

The meridian on the globe or sphere, is represented by the brazen circle, in which the globe hangs and turns. It is divided into four times 90, or 360° , beginning at the equinoctial. See GLOBE. On it, each way from the equinoctial, on the celestial globes, is counted the south and north declination of the sun or stars; and on the terrestrial globe, the latitude of places north or south. There are two points of this circle, which are called the poles of the world; and a diameter continued from thence through the center of either globe, is called the axis of the earth or heavens, on which they are supposed to turn round. On the terrestrial globes there are usually thirty-six meridians drawn, one thro' every tenth degree of the equator, or thro' every tenth degree of longitude. The uses of this circle are. 1. To set the globes to any particular latitude. 2. To shew the sun's or a star's declination, right ascension, or greatest altitude, &c.

To find the sun's MERIDIAN altitude or depression at night, by the globes. Bring the sun's place to the meridian above the horizon for his altitude at noon; which will shew the degrees of it, counted from the horizon. For his midnight depression below the north-point of the horizon, you must bring the opposite point to the sun's present place, as before to the meridian; and the degrees there intercepted between that point and the horizon, are his midnight depression.

Meridian line is an arch or part of the meridian of a place, terminated each way by the horizon. Or it is the intersection of the plane of the meridian of the place with the plane of the horizon, vulgarly called a north and south line, because its direction is from one pole towards the other. It is of great use in astronomy, geography, dialling, &c. and on its exactness all depends; whence divers astronomers have took infinite

Fig. 2. MELES, the BADGER.



Fig. 1. MATRICARIA.



Fig. 3. MAXIMUM.

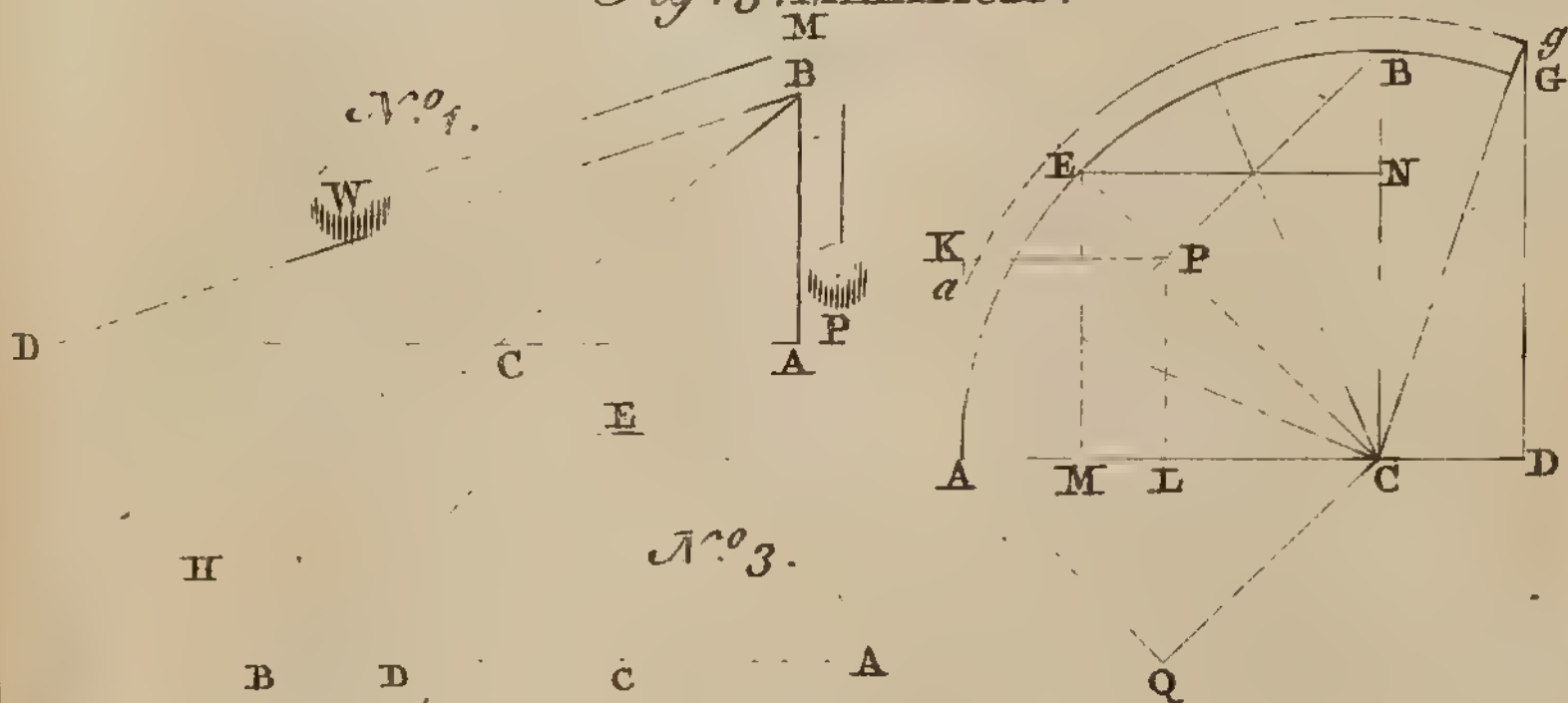


Fig. 4. MERIDIAN.

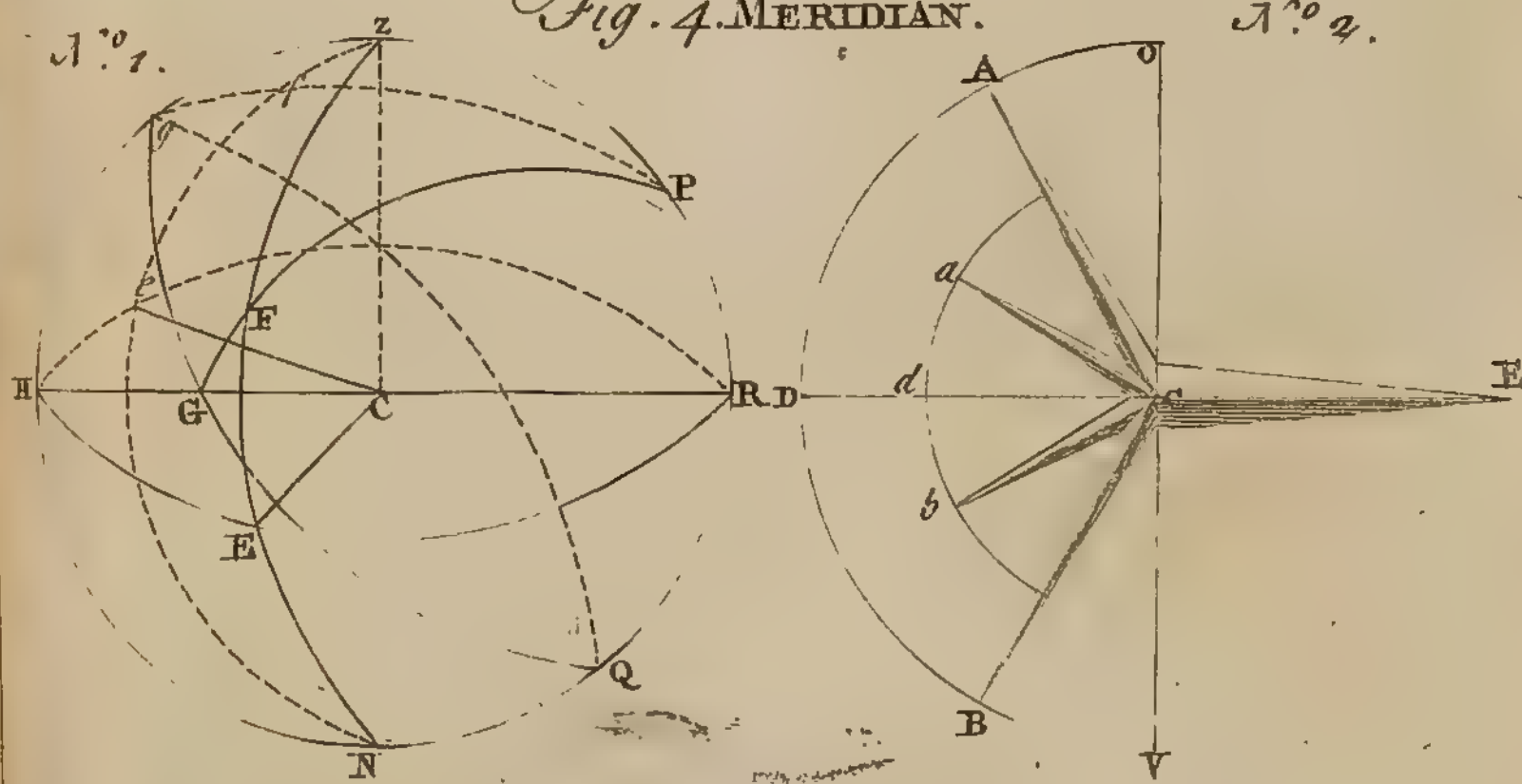
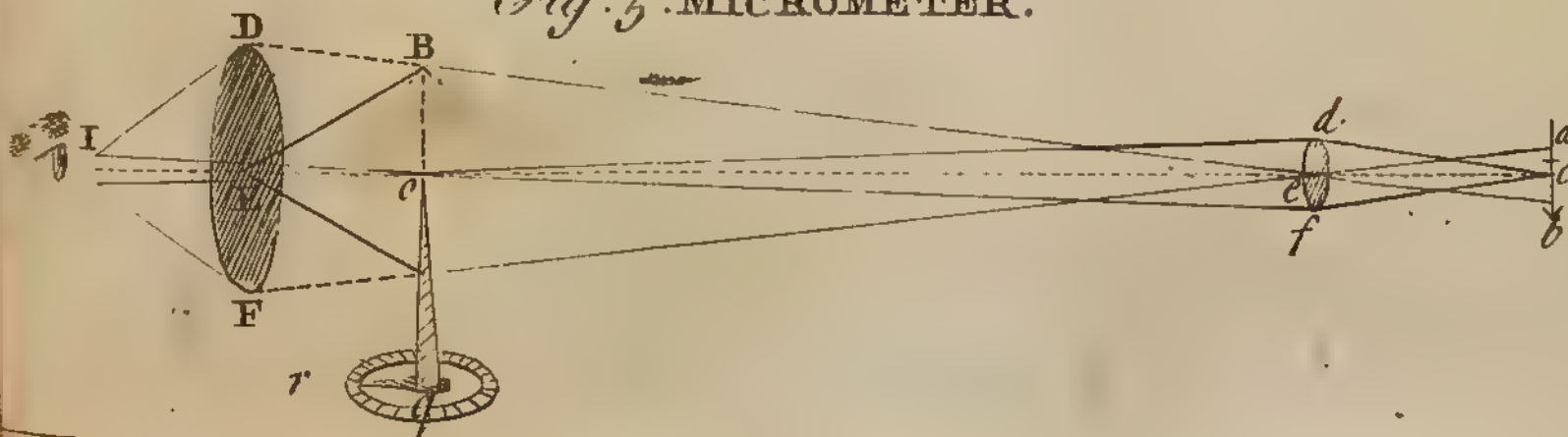


Fig. 5. MICROMETER.



finite pains to have it to the last precision.

To draw a MERIDIAN line. Knowing the south quarter pretty nearly, observe the altitude FE (plate CLXXI. fig. 4. n^o 1. of some star on the eastern side thereof, not far from the meridian HZR : then, keeping the quadrant firm on its axis, so as the plumbet may still cut the same degree, only directing it to the western side of the meridian, wait till the star has the same altitude as before, *f e*. Lastly, bisect the angle ECe , formed by the intersection of the two planes wherein the quadrant is placed at the time of the two observations, by the right line HR . This line HR is a meridian line.

Or thus: which is a very easy and good method for practice. On an horizontal plane, from the center C , (*ibid*, n^o 2.) describe several concentric arches BA , ba , &c. and on the same center C , erect a style or gnomon, perpendicular to the plane ACB , a foot or half a foot long. About the time of the tropics before noon, between the hours of nine and eleven in the morning, and between one and three in the afternoon, observe the points B , b , &c. A , a , wherein the shadow of the style terminates. Bisect the arches AB , ab , &c. in D , d , &c. If then the right line DE bisect all the arches AB , ab , &c. it will be the meridian line sought. As the extremity of the shadow is somewhat hard to determine, it will be convenient to have the style flat at the top, and to drill a little hole, noting the lucid spot projected by it on the arches AB and ab , instead of the extremity of the shadow.

Hence, if the meridian line be bisected by a right line OV , drawn perpendicularly through the point C , OV , will be the intersection of the meridian, and first vertical, and consequently O will shew the east point, and V the west.

MERIDIAN LINE, on a dial, is a right line arising from the intersection of the meridian of the place, with the plane of the dial: this is the line of twelve o'clock, and from hence the division of the hour-lines begins. See the article **DIAL**.

Magnetical MERIDIAN, is a great circle passing through the magnetical poles, to which the magnetic needle, or needle of the mariner's compass, conforms itself.

MERIDIAN altitude of the sun or stars, is their altitude when in the meridian of the place where they are observed. Or it may be defined, an arch of a great circle perpendicular to the horizon, and compre-

hended between the horizon and the sun or star then in the meridian of the place. *To take the MERIDIAN altitude with a quadrant.* If the position of the meridian be known, and the plane of an astronomical quadrant be placed in the meridian line, by means of the plumb-line suspended at the center, the meridian altitudes of the stars, which are the principal observations whereon the whole art of astronomy is founded, may easily be determined. The meridian altitude of a star may likewise be had by means of a pendulum-clock, if the exact time of the star's passage by the meridian be known. Now it must be observed, that stars have the same altitude for a minute before and after their passage by the meridian, if they be not in or near the zenith; but if they be, their altitudes must be taken every minute when they are near the meridian, and their greatest altitudes will be the meridian altitudes sought. See **QUADRANT**.

MERIDIONAL DISTANCE, in navigation, is the same with the departure, easting or westing; or the difference of longitude between the meridian under which the ship now is, and any other meridian she was before under.

MERIDIONAL PARTS, MILES, or MINUTES, in navigation, are the parts by which the meridians in Mr. Wright's chart (commonly though falsely called Mercator's) do increase as the parallels of latitude decrease: and as the cosine of the latitude of any place, is equal to the radius or semi-diameter of that parallel; therefore, in the true sea-chart, or nautical planisphere, this radius being the radius of the equinoctial, or whole sine of 90°, the meridional parts at each degree of latitude must increase, as the secants of the arch, contained between that latitude and the equinoctial, do decrease. The tables therefore of meridional parts, which we have in books of navigation, are made by a continual addition of secants; they are calculated in some books for every degree and minute of latitude; and they will serve either to make or graduate a Mercator's chart, or to work the Mercator's sailing. To use them, you must enter the table with the degree of latitude at the head, and the minute on the first column towards the left hand, and in the angle of meeting you will have the meridional parts. Having the latitudes of two places, to find the meridional miles or minutes between them, consider whether one of the places lies on the equator,

equator, or both on the same side of it, or, lastly, on different sides. 1. If one of the proposed places lies on the equator, then the meridional difference of latitude is the same with the latitude of the other place, taken from the table of meridional parts. 2. If the two proposed places be on the same side of the equator, then the meridional difference of latitude is found by subtracting the meridional parts answering to the least latitude, from those answering to the greatest, and the difference is that required. 3. If the places lie on different sides of the equator, then the meridional difference of latitude is found by adding together the meridional parts answering to each latitude, and the sum is that required.

We have here added a table of meridional parts calculated both for the sphere and oblate spheroid, by the reverend Mr. Murdoch, in his new and learned Treatise of Mercator's Sailing applied to the true Figure of the Earth. By this table may be projected a true chart, for any part of the earth's surface, and the several problems of sailing may be solved by it. Maps of countries may be delineated and applied to the various purposes of navigation, geography, and astronomy. Nor are the errors of the common spherical projections so very small in many cases, as to be inconsiderable and not dangerous. For instance, if a ship sails from south latitude 25° , to north latitude 30° , and the angle of the course be 43° ; then the difference of longitude by the common table would be $3206'$, exceeding the true difference $3141'$ by $65'$, or miles. Also the distance sailed would be 4512 , exceeding the true distance, 4423 , by $89'$, or miles; which differences are too great to be neglected. For other instances of such a correction of the charts, we refer to the author's admirable book above-mentioned.

A Table of meridional Parts to the Spheroid and Sphere, with their Differences.

| D. | Spheroid. | Sphere. | Diff. |
|----|-----------|---------|-------|
| 1 | 58.7 | 60.0 | 1.3 |
| 2 | 117.3 | 120.0 | 2.7 |
| 3 | 176.1 | 180.1 | 4.0 |
| 4 | 234.9 | 240.2 | 5.3 |
| 5 | 293.8 | 300.4 | 6.6 |
| 6 | 352.7 | 360.6 | 7.9 |
| 7 | 411.8 | 421.0 | 9.2 |
| 8 | 471.0 | 481.5 | 10.5 |

| D. | Spheroid. | Sphere. | Diff. |
|----|-----------|---------|-------|
| 9 | 530.4 | 542.2 | 11.8 |
| 10 | 589.9 | 603.0 | 13.1 |
| 11 | 649.7 | 664.1 | 14.4 |
| 12 | 709.6 | 725.3 | 15.7 |
| 13 | 769.8 | 786.8 | 17.0 |
| 14 | 830.2 | 848.5 | 18.3 |
| 15 | 890.9 | 910.5 | 19.6 |
| 16 | 951.8 | 972.7 | 20.9 |
| 17 | 1013.1 | 1035.3 | 22.2 |
| 18 | 1074.8 | 1098.3 | 23.5 |
| 19 | 1136.8 | 1161.6 | 24.8 |
| 20 | 1199.2 | 1225.2 | 26.0 |
| 21 | 1262.0 | 1289.2 | 27.2 |
| 22 | 1325.3 | 1353.7 | 28.4 |
| 23 | 1389.0 | 1418.6 | 29.6 |
| 24 | 1453.3 | 1484.1 | 30.8 |
| 25 | 1518.0 | 1550.0 | 32.0 |
| 26 | 1583.3 | 1616.5 | 33.2 |
| 27 | 1649.1 | 1683.5 | 34.4 |
| 28 | 1715.6 | 1751.2 | 35.6 |
| 29 | 1782.7 | 1819.5 | 36.8 |
| 30 | 1850.5 | 1888.4 | 37.9 |
| 31 | 1919.0 | 1958.0 | 39.0 |
| 32 | 1988.2 | 2028.3 | 40.1 |
| 33 | 2058.3 | 2099.5 | 41.2 |
| 34 | 2129.0 | 2171.4 | 42.3 |
| 35 | 2200.8 | 2244.2 | 43.4 |
| 36 | 2273.4 | 2317.9 | 44.5 |
| 37 | 2347.0 | 2392.6 | 45.6 |
| 38 | 2421.6 | 2468.3 | 46.7 |
| 39 | 2497.2 | 2544.9 | 47.7 |
| 40 | 2573.9 | 2622.6 | 48.7 |
| 41 | 2651.8 | 2701.5 | 49.7 |
| 42 | 2730.9 | 2781.6 | 50.7 |
| 43 | 2811.3 | 2863.0 | 51.7 |
| 44 | 2893.1 | 2945.8 | 52.7 |
| 45 | 2976.2 | 3029.9 | 53.7 |
| 46 | 3060.9 | 3115.5 | 54.6 |
| 47 | 3147.2 | 3202.7 | 55.5 |
| 48 | 3235.1 | 3291.5 | 56.4 |
| 49 | 3324.8 | 3382.1 | 57.3 |
| 50 | 3416.3 | 3474.5 | 58.2 |
| 51 | 3509.7 | 3568.8 | 59.1 |
| 52 | 3605.0 | 3665.2 | 59.9 |
| 53 | 3703.1 | 3763.8 | 60.7 |
| 54 | 3803.1 | 3864.6 | 61.5 |
| 55 | 3905.7 | 3968.0 | 62.3 |
| 56 | 4010.9 | 4073.9 | 63.0 |
| 57 | 4118.9 | 4182.6 | 63.7 |
| 58 | 4229.8 | 4294.2 | 64.4 |
| 59 | 4344.0 | 4409.1 | 65.1 |
| 60 | 4461.5 | 4527.3 | 65.8 |
| 61 | 4582.7 | 4649.2 | 66.5 |
| 62 | 4707.8 | 4775.0 | 67.2 |
| 63 | 4837.1 | 4904.9 | 67.8 |
| 64 | 4971.0 | 5039.4 | 68.4 |
| 65 | 5109.8 | 5178.8 | 69.0 |
| 66 | 5254.0 | 5323.6 | 69.6 |

| D. | Sphe- roid. | Sphere. | Diff. |
|----|----------------|---------|--------|
| 67 | 5403.9 | 5474.0 | 70. 1 |
| 68 | 5560.2 | 5630.8 | 70. 6 |
| 69 | 5723.5 | 5794.6 | 71. 1 |
| 70 | 5894.4 | 5965.9 | 71. 5 |
| 71 | 6073.7 | 6145.6 | 71. 9 |
| 72 | 6262.4 | 6334.7 | 72. 3 |
| 73 | 6461.6 | 6534.3 | 72. 7 |
| 74 | 6672.6 | 6745.7 | 73. 1 |
| 75 | 6896.8 | 6970.3 | 73. 5 |
| 76 | 7136.2 | 7210.0 | 73. 8 |
| 77 | 7393.0 | 7467.1 | 74. 1 |
| 78 | 7670.1 | 7744.5 | 74. 4 |
| 79 | 7970.9 | 8045.6 | 74. 7 |
| 80 | 8300.2 | 8375.2 | 75. 0 |
| 81 | 8663.8 | 8739.0 | 75. 2 |
| 82 | 9070.0 | 9145.4 | 75. 4 |
| 83 | 9530.2 | 9605.8 | 75. 6 |
| 84 | 10061.1 | 10136.9 | 75. 8 |
| 85 | 10688.7 | 10764.6 | 75. 9 |
| 86 | 11456.5 | 11532.5 | 76. 0 |
| 87 | 12446.0 | 12522.1 | 76. 1 |
| 88 | 13840.4 | 13916.4 | 76. 0 |
| 89 | 16223.8 | 16299.5 | 75. 7 |
| 90 | | | 37. 75 |

MERIONETHSHIRE, a county of north Wales, bounded by Caernarvon and Denbighshire on the north, by Montgomeryshire on the south-east, and by the Irish sea on the west.

MERIT, in theology, signifies desert. This term is more particularly used to signify the moral goodness of the actions of men, and the rewards to which those actions intitle them.

The romish schoolmen distinguish merit towards God into two kinds, *viz.* merit of congruity; and merit of condignity. The first, which is improperly called merit, is when there is no manner of proportion between the action and the reward, but he who bestows it, supplies, by his goodness, what is wanting in the action. Merit of condignity is when there is a just and strict proportion between the action and the reward, as in the wages of a workman. Protestants disclaim all merit of this kind.

MERK, a river of the Austrian Netherlands, which rises in the province of Brabant, and falls into the sea, opposite to the island Overflackee in Holland.

MERLIN, *asalon*, in ornithology, the least of the hawk kind, but much resembling the haggard-falcon.

The merlin, if well manned, makes an excellent hawk, which will naturally fly

at a partridge, thrush, or lark. See the articles **FALCON** and **HAWK**.

MERLON, in fortification, is that part of a parapet which is terminated by two embrasures of a battery. Its height and thickness is the same with that of the parapet; but its breadth is generally nine feet on the inside, and six on the outside. It serves to cover those on the battery from the enemy; and is better when made of earth well beat and close, than when built with stone; because these fly about and wound those they should defend.

MERLUCIUS, in ichthyology, a fish called in english the hake. See **HAKE**.

MERMAID, or **MERMAN**, an imaginary animal, supposed to be half human and half fish; which probably took its rise from an imperfect view of the fish called *thrichechus*. See **THRICHECHUS**.

MERNS, a county of Scotland, bounded by Mar on the north, by the German ocean on the east, by Angus on the south, and by Gowry on the west.

MERO, a town of the further india, situated in the kingdom of Pegu: east long. 94°, and north lat. 17°.

MEROPS, the **BEE-EATER**, in ornithology, the blue-breasted *ispida*, with a variegated head; a very beautiful bird, somewhat larger than the common kingfisher. See the article **ISPIDA**.

It catches bees and other flying insects while on the wing, whence its english name: they usually fly in flocks, and make a loud but not disagreeable noise, somewhat like that of a man whistling.

MERS, a county of Scotland, bounded by Lothian on the north, by the German ocean on the east, by Northumberland and Tiviotdale on the south, and by Tweeddale on the west.

MERSBURG, a city of upper Saxony, in the marquisate of Misnia, sixteen miles north-west Leipzig.

MERSPURG, a city of Germany, in the circle of Swabia and bishopric of Constance, eight miles north east of the city of Constance.

MERTOLA, a town of Portugal, in the province of Alentejo: west long. 8° 15', and north lat. 37° 35'.

MERUE, the north branch of the river Maes, on which the city of Rotterdam is situated.

MERVILLE, a town of french Flanders, near the confines of Artois: east longit. 2° 36', and north lat. 50° 40'.

MERULA, the **BLACKBIRD**, in ornithology,

logy, a species of the *turdus* or thrush-kind. See the article *TURDUS*.

It is about the size of the common thrush, all over black, except the beak and eyelids, which are yellowish.

There is also another species, called *merula saxatilis*, of a grey colour, with pin-nated plumes : it is about the size of the former.

MESCHED, or **THUS**, a city of Persia, in the province of Chorassan : east. lon. $57^{\circ} 30'$, and north lat. 36° .

MESEEN, the capital of a province of the same name, in Russia : it is a port town, situated on the coast of the White-sea, one hundred and fifty miles north-east of Archangel.

MESEMBRYANTHEMUM, in botany, a genus of the polyandria-pentagynia class of plants; the corolla whereof consists of a single petal, with a multitude of petals of a lanceolated, narrow figure, formed into several series a little longer than the cup, and cohering at the base by their ungues; the fruit is a fleshy, roundish capsule, with a radiated umbilicus, and with a number of cells equal to that of the styles; the seeds are numerous and roundish. The number of styles is sometimes ten, and sometimes they, and the segments of the calyx, are only four.

This genus comprehends the ice-plant, and the flowering-kali.

MESENTERIC FEVER, called by Heister the stomachic or intestinal fever, and by Sydenham the new fever, is, by the generality of those who have wrote about it, referred to the malignant kind from its being usually attended with severe and uncommon symptoms. It differs from other acute fevers, according to Heister, in being always attended with a diarrhoea, which however is salutary, and is dangerous to stop. This fever has its seat in the stomach and intestines. Many of the distempers mentioned by authors under peculiar names, are properly to be referred, as to their causes, to this species of fever : the dysenteric is absolutely of this kind; and many of the petechial ones. The patient is seized with this distemper, which returns at different and irregular intervals, with frequent shiverings; after these, the tongue, teeth, and fauces are covered with a foul and viscid phlegm; the tongue in particular, after looking yellowish and blackish with it: the patient perceives a disagreeable taste in his mouth from this, and the people about

him an ill smell : the hypochondria are always distended, and often in pain: the urine becomes turbid, and deposits a muddy sediment, during the whole course of the distemper. In the cure, all hot medicines must be avoided, and the discharge of the peccant matter by the diarrhoea must be promoted by clysters and by purging medicines: some advise aloes and other medicines of that kind; others sena and manna; some the purging salts; but most prefer rhubarb given in often repeated small doses: large draughts of the lubricating decoctions, such as barley-water and water-gruel, are to be given, and emulsions of sweet-almonds and of the cold seeds: small quantities of oil of sweet-almonds are also to be given at times, and juleps of the cooling waters, and syrups moderately acidulated; and powders of nitre, cinnabar, and the common absorbents, as crab's eyes, and the like, are to be given, to take off the pains, and spasms, and to attemperate the acid matter. The diet is not to be so very thin and weak as in other acute fevers, but moderate nourishment is to be allowed.

MESENTERY, in anatomy, a thick fat membrane, placed in the midst of the intestines particularly of the smaller ones, whence it has the name. Its substance is composed of membranes, fat, vessels of all kinds, and in the human body of a number of glands. In the upper part, it is connected with the three superior vertebræ of the loins; and in the lower, with the intestines, and particularly with the jejunum and ileum; to which it also gives their outer coat. When it is separated from the intestines, it has several folds resembling gloves. Its length, in the whole, is about three ells; but the intestines which are joined to it, are at least four times that length. Its coats or membranes are two, and between these there is a cellular substance, which contains the fat: the meseraic vessels and glands are also placed there, which many reckon a third coat of the mesentery, and that not improperly; this they call the tunica cellulosa.

The vessels of the mesentery are blood-vessels, nerves, lacteals, and lymphatics. The blood-vessels are the same with those of the intestines, and these make a multitude of strange meanders, and have very frequent anastomoses. The nerves also come from the par vagum, and the intercostals.

costals. There are a multitude of glands dispersed throughout the whole mesentery: these vary greatly in their size, figure, and situation in different subjects, and in old people they frequently almost disappear. In comparative anatomy we find, that in dogs there is only one, but that very large, called pancreas Asellii: the lacteal vessels pass thro' these glands. The uses of the mesentery are, 1. To suspend, connect together, and retain in their due place all the intestines. 2. To sustain the sanguiferous and lacteal vessels of the intestines. And, 3. To make the way for the lacteals, to the receptacle, the shorter.

MESNE, in law, signifies him who is lord of a manor, and who hath tenants holding of him, yet himself holding of a superior lord. This word also signifies a writ, which lies where there is a lord-mesne and tenant, and the tenant is distrained for services due from the mesne to the superior lord.

MESOCOLON, in anatomy, that part of the mesentery connected with the great guts, especially the colon. See the article MESENTERY.

The mesocolon meets the midst of the colon, to which it is joined. Its lower part sticks to a part of the rectum.

MESOLABE, an instrument used by the antients for finding two mean proportionals mechanically, which they could not effect geometrically.

It consisted of three parallelograms, moving in a groove to certain intersections.

MESOLOGARITHMS, according to Kepler, are the logarithms of the co-sines and co tangents, the former of which were called by lord Napier antilogarithms, and the latter differentials.

They are otherwise called artificial sines and tangents. See LOGARITHM, SINE, TANGENT, &c.

MESOPLEURII, in anatomy, the intercostal muscles. See INTERCOSTAL.

MESOPOTAMIA, the ancient name of Diarbeck. See the article DIARBECK.

MESOPTERYGIUS, in ichthyology, a term applied to such fishes as have only one back fin, and that situated in the middle of the back. See the article ICHTHYOLOGY.

MESPILUS, the MEDLAR, in botany, a genus of the icofandria pentagynia class of plants, the flower of which is made up of roundish hollow petals; and its fruit is an umbilicated globose berry, containing five fleshy and gibbous seeds.

The fruit of the medlar is very grateful, though not eatable till rotten.

MESSASIPPI, or MESCHASIPPI, a country of North America, bounded by Canada on the north, the british plantations on the east, the gulph of Mexico on the south, and the province of New Mexico on the west. See LOUISIANA.

MESSASIPPI, the river which gives name to the country, rises in Canada, and runs to the southward till it falls into the gulph of Mexico.

MESSENGERS, are certain officers chiefly employed under the direction of the secretaries of state, and always in readiness to be sent with all kinds of dispatches foreign and domestic. They also, by virtue of the secretaries warrants, take up persons for high treason, or other offences against the state. The prisoners they apprehend are usually kept at their own houses, for each of which they are allowed 6 s. 8 d. per day, by the government: and when they are sent abroad, they have a stated allowance for their journey, viz. 30 l. for going to Paris, Edinburgh, or Dublin; 25 l. for going to Holland, and to other places in the same proportion; part of which money is advanced, for the expence of their journey. Their standing salary is 45 l. *per annum*; and their posts, if purchased, are esteemed worth 300 l. The messengers wait twenty at a time, monthly, and are distributed, as follows, viz. four at court, five at one secretaries office, five at another, two at the third for North Britain, three at the council-office, and one at the lord chamberlain's of the household.

MESSENGERS of the *exchequer*, are four officers who attend the exchequer, in the nature of pursuivants, and carry the lord treasurer's letters, precepts, &c.

MESSENGER of the *press*, a person, who, by order of the court, searches printing-houses, booksellers-shops, &c. in order to discover the printers or publishers of seditious books, pamphlets, &c.

MESSENGER at arms, in the scottish polity, officers whose business it is to execute summons and letters of diligence for civil debt, real or personal; thus called from the impress of the king's arms on their blazon, being a piece of brass or silver fixed upon the messenger's breast, to discover his warrant and authority, when he discharges the duty of his office; and the resisting him therein, is a crime, in the law of Scotland, called *deforcement*. See the article DEFORCEMENT.

The messengers at arms, of whom there are a great number, are among the officers under the lyon, who, together with his brethren the heralds, is the judge of the malversation of messengers. See *COLLEGE of Herald's*, *KING at Arms*, &c. **MESSIAH**, the anointed; a title which the Jews gave to their expected great deliverer, whose coming they still wait for: and a name the Christians apply to Jesus Christ, in whom the prophecies relating to the Messiah were accomplished. Among the Jews, anointing was the ceremony of consecrating persons to the highest offices and dignities; kings, priests, and sometimes prophets were anointed: thus Aaron and his son received the sacerdotal, Elisha the prophetic, and David, Solomon, and others, the royal unction.

The prophecies in the Old Testament, which relate to the coming of the messiah are very numerous, some of which may be found in Gen. iii. 15. xlix. 10. Isaiah vii. 14. Dan. ix. 25, &c.

The antient Hebrews being instructed by the prophets, had very clear notions of the messiah: these were changed by little and little, insomuch that when Jesus Christ appeared in Judea, they were in expectation of a temporal monarch, who should free them from their subjection to the Romans. Hence they were greatly offended at the outward appearance, the humility, and seeming weakness of our Saviour; which prevented their acknowledging him to be the Christ they expected. The latter Jews have fallen into still greater mistakes, and formed to themselves chimerical notions of the Messiah, utterly unknown to their forefathers. Some think he is already come, in the person of king Hezekiah: this opinion was first advanced by the famous Hillel, who lived before Christ. Others think the belief of the coming of the messiah, is no article of faith; and that he who denies this doctrine, makes but a small breach in the law; he only lops off a branch from the tree, without hurting the root. But the greatest part of the modern rabbins, according to Buxtorf, believe that the messiah is already come, but that he keeps himself concealed, and will not manifest himself because of the sins of the Jews. Some assign him the terrestrial paradise for the place of his abode: others, the city of Rome, where, they say, he keeps himself concealed among the leprous and infirm, at the gate of the city, expecting

Elias to come and manifest him to men. But the most general opinion of the Jews is, that the messiah is not yet come; and these are strangely divided about the time and other circumstances of his coming: different times have been fixed for his appearance, many of which are elapsed, and consequently their hopes have been baffled; insomuch that they have pronounced an anathema against all those who shall pretend to calculate his coming. In order to reconcile those prophecies which seem to oppose each other, some of the Jews have had recourse to an hypothesis of two messiahs, who are to succeed each other: one in a state of humiliation, poverty, and suffering; the other, of glory, splendor, and power. This first is to proceed from the tribe of Joseph, and the family of Ephraim; his father is to be called Huziel, and himself Nehemiah: the second is to be born of the race of David, to rebuild the temple of Jerusalem, and reign over the whole world. Our Saviour foretold that false Christs should arise, who should perform signs and wonders, by which even the elect should be in danger of being deceived. The event has verified this prediction, and there has been a considerable number of these, from Barchochebas, who arose in the reign of the emperor Adrian, to Zabatai Tzeyi, who appeared about the year 1666.

MESUA, in botany, a genus of the polyandria-monogynia class of plants, the corolla whereof consists of four large, hollow, rounded petals; the fruit is a coriaceous capsule, of a roundish, acuminate figure, formed of four valves, and marked with as many elate sutures running longitudinally; the seeds are four, large and fleshy, of a turbinated, triquetrous and obtuse form.

METACARPUS, in anatomy, that part of the hand between the wrist and the fingers. See *HAND* and *WRIST*.

The metacarpus consists of four bones, which answer to the four fingers, whereof that which sustains the fore-finger is the biggest and longest. They are all round and long, a little convex towards the back of the hand, and concave and plain towards the palm. They are hollow in the middle, and full of marrow; they touch one another only at their extremities, having spaces in the middle, in which lie the muscoli interossei. See the article *INTEROSSEUS*.

In their upper end there is a sinus, which receives

receives the bones of the wrist; their lower extremity is round, and is received into the sinus of the first bones of the fingers. See the article FINGER.

The inner part of the metacarpus is called the palm, and the other the back of the hand. See the article PALM.

For fractures and luxations of the metacarpus, see the articles HAND, WRIST, FRACTURE, and LUXATION.

METACARPUS, signifies, also, a small, very fleshy muscle, situated obliquely between the large internal annular or transverse ligament of the carpus, and the whole inside of the fourth metacarpal bone.

It is fixed by a small, short tendon to the os orbiculare, and to the neighbouring part of the large ligament of the carpus. From thence its fibres run more or less obliquely, towards the inside of the fourth metacarpal bone; the fibres of this muscle are of unequal lengths, and extend all the way to the articulation of the first phalanx of the little finger with the fourth metacarpal bone, but have no manner of relation to that finger. This muscle serves to turn the fourth bone of the metacarpus towards the thumb, and at the same time to increase the convexity of the back of the hand, which is called making Diogenes's cup. The fourth bone, thus moved, carries the third along with it, by reason of their connexion, which still augments the hollow on one side, and the convexity on the other.

METAGITNION, *μεταγίτνιον*, in chronology, the second month of the Athenian year, containing twenty-nine days, and answering to the latter part of our July, and beginning of August.

METALS, *metalla*, in natural history, are defined to be fossile bodies, fusible by fire, concreting again in the cold, and malleable, or distensible and ductile under the hammer. These are the distinguishing characters of those bodies in their pure state: but many of them are not found in this pure state in the earth, being reduced by admixtures of sulphur and other bodies to the state of ore. See ORE. The class of the metals, according to these characters, include six bodies, *viz.* gold, silver, copper, tin, iron, and lead. For the properties, preparations, uses, and peculiar characters, &c. of each, see the articles GOLD, SILVER, &c.

The weight of the metals is one of their great distinguishing characters, from all other substances: and it serves also, by

means of the hydrostatical balance, by which their specific gravities are accurately determined, to distinguish them even in mixture from one another, in a manner that no other means could ever come up to: the specific gravity of each metal may be seen in the table of specific gravities, under the article GRAVITY.

The chemists have divided the metals into two classes, the perfect and the imperfect. Gold and silver only are allowed to be of the first class, as losing nothing of their weight, nor receiving any alteration in the fire; the other four, as they want this quality of resisting the force of the heat, they call imperfect: but this is thought to be a distinction not very obvious, nor essential. The learned Boerhaave, from his History of Metals, draws the following corollaries: 1. That metals differ absolutely from all other natural or artificial bodies hitherto discovered, since the lightest metal is more than double the weight of the heaviest non-metalline body. 2. They therefore are greatly mistaken, who expect, by any conversion of substance, to take metals out of bodies non metalline; since condensation is the most difficult of all operations; and weight being the index of corporeal quantity, requires something like a creative power to increase it. 3. True metals do not discover the affinity of their matter by any thing more evidently than by their resemblance in point of weight. 4. Nothing therefore resembles gold more nearly than quicksilver, with regard to the matter in both. 5. The other properties of metals, as fixity, colour, malleability, and simplicity, may probably be produced and changed with more ease than their weight. 6. Gold therefore consists of a most pure simple matter, like mercury, fixed by another pure, simple, subtle principle, diffused through its minutest parts, and intimately uniting them to one another, and to itself. This the chemists mean, when they say it consists of mercury and sulphur. 7. The other metals consist of the same principles, but together therewith have another light matter intermixed, which is different in the different metals, and is called earth; consequently these are composed of three matters, to which in some may be added crude sulphur. 8. The different metals are resolvable, therefore, into different elements, both in respect of nature and number. 9. This resolution may be effected by means of mercury, regenerat-

ing salts, or fire, but differently, according to the different metals. 10. It is a mistake, therefore, to say that metals may be easily converted into one another, excepting with regard to the mercurial parts, and by first utterly destroying their form; and consequently the quantity of gold procured from any other metal by transmutation, can only be in proportion to the quantity of mercury it before contained. 11. Nor does it appear that any besides the six above-mentioned metals can be procured by art, how confidently soever Van Helmont may have asserted this of mercury fixed by the alkahelst. 12. All the six metals, when fused by fire in clean vessels, have the same appearance and perfectly resemble mercury, both in respect of colour, density, the sphericity of their drops, the attraction of their parts, their mobility and manner of running: hence, therefore, it seems to follow, that mercury is a metal fused by the smallest fire; that tin requires a greater degree of fire, and that if the atmosphere were hot enough to fuse it, it would be mercury, but mercury which smokes and casts up a froth: that lead would also be mercury with the next degree of heat, but mercury with certain peculiar properties of frothing and penetrating vessels: so silver and gold are mercury, which require a much greater degree of fire, and remain immutable therein: copper again is mercury, which melts in a much intenser heat, but is changed withal: lastly, iron becomes mercury in a degree of heat beyond any, though changeable thereby.

For the chemical character of metals, assaying metals, coppelling of metals, solution of metals by menstruums, &c. see the articles CHARACTER, METALLURGY, ASSAYING, COPPELLING, MENSTRUUM, &c.

For the generation of metals by earthquakes. See the article EARTHQUAKE.

Prince's METAL, called also *Bath-METAL*, a kind of factitious metal, of a beautiful yellow, and disposed to receive a fine polish lustre, &c. It is prepared, according to Dr. Shaw, as follows: take six ounces of copper, melting it in a wind-furnace; add to it one ounce of zink; then stirring the whole well together, pour out the metal immediately. The copper and zink may be put into the crucible together, if first covered over with the black flux, which prevents the

evolution of the zink, or preserves its metalline form. See the article FLUX.

Bell-METAL. See the article BELL.

Homborg's METAL, an imitation of gold. See the article GOLD.

Semi-METALS, metallic fossils, fusible by fire, and not malleable in their purest state.

These are all, in their native state, penetrated by, and intimately mixed with sulphur, and other adventitious matter, and reduced to what are called bres.

Of this series of fossils there are only five bodies, all naturally comprehended in the same class, but each making a separate and distinct genus: these are antimony, bismuth, cobalt, zink, and quicksilver. For the characters, preparations, and uses of each, see ANTIMONY, BISMUTH, COBALT, ZINK, and MERCURY.

METAL, in heraldry. There are two metals used in heraldry, by way of colours, viz. gold and silver; in blazon called *or* and *argent*.

In the common painting of arms these metals are represented by white and yellow, which are the natural colours of those metals. In engraving, gold is expressed by dotting the coat, &c. all over; and silver, by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour upon colour; so that if the field be of one of the metals, the bearing must be of some colour; and if the field be of any colour, the bearing must be of one of the metals.

METALLIC, or *METALLINE*, an adjective applied to something that bears a relation to metals. See METAL.

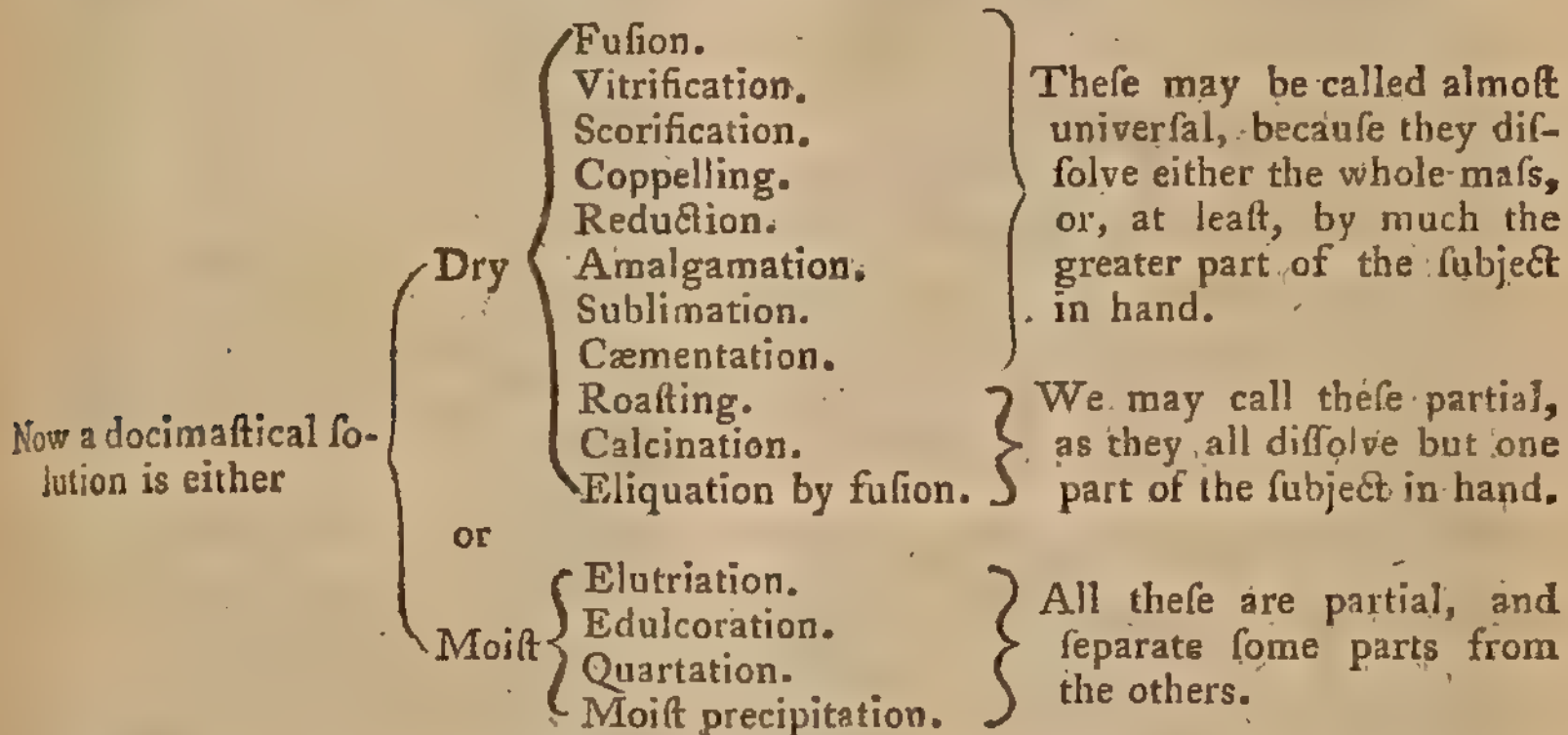
METALLURGY, *metallurgia*, according to Boerhaave, comprehends the whole art of preparing and working metals, from the glebe, or ore, to the utensil; in which sense, assaying, smelting, refining, smithery, gilding, &c. are only branches of metallurgy.

Dr. Shaw however restrains metallurgy to those operations required to separate metals from their ores, for the uses of life. These operations are of two kinds, or smaller and large; with regard to which the whole art of metallurgy may be divided into two parts, assaying and smelting. See ASSAYING, &c.

Dr. Cramer observes, that the art of assaying consists in a well-made separation of minerals, especially metals, and in a division of the several constituent parts of them

them from each other, in order that the quantity and quality of each in particular may be known: it is plain that those operations which belong to the general class of solution, appertain strictly and primarily to this; and that the others which are performed by the assayer, are only secondary or auxiliary operations. But there is hardly any chemical operation which is not sometimes necessary to be performed in the art of assaying: there are many, on the contrary, which are peculiar to assaying alone; therefore

we shall here give a general view of those which properly belong to it; or of those which, though taken from chemistry at large, are nevertheless used by assayers; only first observing that every primary docimastical operation may, on account of its effects, be called solution, since, in every operation, the menstrea, among which, I think, the air and fire have a right to be classed, effect a solution, by interposing themselves between the parts of the objects to be changed. See the articles MENSTRUUM and FLUX.



An account of each of these may be found under their proper heads.

Dr. Shaw, after mentioning the manner of extracting metal from the ore, by assaying and smelting, gives several axioms and canons of metallurgy, among which are the following: that the art of assaying is hitherto imperfect, but capable of receiving considerable improvement from chemical and mechanical knowledge: that the troublesome and expensive method of separating gold from silver by quartation, may be advantageously superseded, or set aside, by means of fusion, or a dexterous management of the fire: that gold and silver are seldom rendered absolutely pure, or separated from all other kinds of metallic or mineral matters; and that to purify them in this manner requires the use of better methods than those commonly used for that purpose; though the thing itself is still performable by art and a suitable process: that sulphur has different effects upon different metals; which effects being well noted; rules of practice might thence be derived, for the farther improvement of metallurgy: that the ignobler metals are separable from each other by the application of proper degrees of heat, so as to make the more fusible

melt away from the less fusible, at least with the assistance of lead: that all metals are reducible by burning or calcination, to terrestrial powders, which, by being melted with any inflammable matter, assume their metalline form: that the great enemies to ductility, or the true metallic nature, are sulphur, cobalt, and things compounded thereof; but that all unctuous or inflammable bodies are friendly to metals, and promote or restore their ductility, when melted therewith: that copper may be made to approach to the colour of gold, and at the same time not lose, but increase its ductility, by being amalgamated with, and distilled from quicksilver; and that probably many artificial or compound metals are discoverable by mixing various metalline and mineral bodies together, so as greatly to enrich and improve the art of metallurgy: that, in general, ores are no more than a natural loose mixture of metallic matter with earthy and sulphureous ones; whence artificial ores may be readily made by calcining a metal with sulphur, and mixing it with earth, so as with heat to form solid lumps of ore, resembling these

those dug out of the mines : and that numerous experiments remain to be made, and facts of nature or observations to be registered, or the relations of bodies to be found, before this useful subject of metallurgy can be brought to perfection.

METAMORPHOSIS, in general, denotes the changing of something into a different form ; in which sense it includes the transformation of insects, as well as the mythological changes related by the antient poets.

Mythological metamorphoses were held to be of two kinds, apparent and real : thus that of Jupiter into a bull, was only apparent ; whereas that of Lycaon into a wolf, was supposed to be real.

Most of the antient metamorphoses include some allegorical meaning, relating either to physics or morality : some authors are even of opinion that a great part of the antient philosophy is couched under them ; and lord Bacon and Dr. Hook have attempted to unriddle several of them.

Ovid's Metamorphoses make an excellent system of morality : the stories of Deucalion and Pyrrha, of Phaëton, of Baucis and Philemon, of Minos and Scylla, &c. being excellent lessons in this way.

METAPHOR, in rhetoric, a trope, by which we put a strange word for a proper word, by reason of its resemblance to it ; or it may be defined, a simile or comparison intended to enforce and illustrate the thing we speak of, without the signs or forms of comparison. Thus, if we say, *God is a shield to good men*, it is a metaphor, because the sign of comparison is not expressed, though the resemblance which is the foundation of the trope, is plain ; for as a shield guards him that bears it, against the attacks of an enemy, so the providence and favour of God protects good men from malice and misfortunes : but if the sentence be put thus, *God is as a shield to good men*, then it becomes a simile or comparison.

A metaphor may be formed from any thing that is the object of any of our senses ; but that is generally the most agreeable and sprightly, which arises from the sense of seeing ; because of all the senses, seeing is the most perfect and comprehensive, the most unwearied and inquisitive, the most desirable and delightful.

If an author is obliged to give a large account of things, plain and in the road of common observation, he should raise

and enoble them by strong and graceful metaphors. This rule Tully has observed in his description of the several parts of this habitable globe, in his book on the Nature of the Gods. So has Virgil, in his Georgics, where he has made his meanest and coarsest subjects fine and admirable, by his judicious use of metaphors ; in his perfect lines, the little affairs of shepherds and farmers appear with dignity ; his descriptions make the country a paradise, and his touches, as a noble writer expresses it, turns every thing into gold. Those are admirable and beautiful metaphors, in which the properties of rational creatures are applied to animals, and those of animals to plants and trees : this way of treating a subject gives life and beauty to the whole creation. But we receive the strongest pleasure from those bold and comprehensive metaphors in which, besides the illustration of the subject they are intended to raise and improve, convey to us a fresh and lively image.

Mr. Du Bos justly observes, that metaphors, and all the other figures of rhetoric, ought to be adapted to the circumstances and situation of those for whose use they are designed, and that we lose much of the beauty of those metaphors which allude to the refreshing shade afforded from the beams of a scorching sun ; and adds, that had Virgil wrote for the cold northern nations, instead of drawing his metaphors from a brook whose cool streams quench the traveller's thirst, or from a grove spreading a delightful shade on the brink of a fountain, he would have taken them from a good warm stove ; from the pleasure a man who is almost stiff with cold, feels upon approaching the fire, or from the slower, but more agreeable, sensation he finds on putting on a coat lined with good comfortable fur.

METAPHRASE, usually signifies something more than either a translation or a paraphrase : according to Baillet, a metaphrast implies a translator, glossator, and interpolator altogether.

METAPHYSICS, *metaphysica transnaturalis*, ontology, or optolophy, a science that treats of being, as such, in the abstract.

All other sciences have a necessary dependence on this, for it supplies them with a foundation and a method to proceed upon, without which, our knowledge of any subject must be very confused and imper-

fect. This was probably the reason that made Aristotle style this science the true beginning of philosophy, and the most noble of all the sciences. As it is wholly conversant in the acts of the understanding it raises itself above the verge of sense and matter, by its abstracted views. The quantity of bodies it refers to the consideration of geometry, and their sensible qualities to natural philosophy, applying itself only to beings separated from their individual singularity, such as substances, accidents, relations, and whatever else may be conceived abstractedly from matter; but particularly beings purely spiritual, such as God, angels, and the soul of man: hence Aristotle terms it natural theology. The end of this science is the search of pure and abstracted truth. It casts a light upon all the objects of thought and meditation, by ranging every being with all the absolute and relative perfections and properties, modes and attendants of it, in proper ranks or classes; and thereby it discovers the various relations of things to each other, and what are their general or special differences from each other; wherein a great part of human knowledge consists: and by this means, it greatly conduces to instruct us in method, or the disposition of putting every thing in its proper rank and class of being, attributes or actions; and hence its proper affinity with logic. See METHOD.

This science, however it may seem to have been laboured, is yet capable of being farther improved: but it has many obstacles in its way. If we are short-sighted in physical matters, which are nearer our sense, and in a manner within our view, how much more must we be bewildered in our search after spiritual abstracted truths, in the consideration of universals, and of things of a transcendent nature, such as fall properly under the consideration of metaphysics. This science proceeds in unfrequented and almost unknown paths, containing very few doctrines of allowed and established certainty; few principles in which men are universally agreed; scarce any just definition, any exact and complete division; and consequently affords large matter for doubts and disputes. For, though metaphysical truths may be certain enough in their own nature, yet they are not usually so to us; but being abstruse things, and lying deep and remote from sense, it is not every one that is capable of understanding them, and there are

fewer yet who understand their true use. Aristotle seems to have been the first founder and inventor of this abstracted method of reasoning, and the consideration of immaterial beings: for his predecessors in philosophy, scarce delivered any thing that was good and solid upon these subjects; and, indeed, antiquity affords nothing upon it composed with so much strength of reason as Cicero's book of the Nature of the Gods. We have but few modern works of this kind, the chief of which are Descartes, Mallebranch, Dr. Willis, Locke, Hutchinson, S^r Gravesande, Dr. Moor, &c.

METAPLASMUS, in grammar, a transmutation or change made in a word, by adding, retrenching, or altering a letter or syllable thereof.

The several species of this figure are ten in number, *viz.* prosthesis, epenthesis, paragoge, diæresis, aphæresis, syncope, apocope, crasis, metathesis and anastrophe; four of which augment the letters or syllables of a word, four retrench them, and two alter them. See the articles, PROSTHESIS, EPENTHESIS, &c.

METASTASIS, in medicine, a transposition or settlement of some humour or disease, on some other part; and sometimes it signifies such an alteration of a disease, as is succeeded by a solution.

METATARSUS, in anatomy, a fleshy mass lying under the sole of the foot. See the article FOOT.

It is fixed by one end in the fore part of the great tuberosity of the os calcis, and running forward from thence, it terminates in a kind of short tendon, which is fixed in the tuberosity and posterior part of the lower side of the fifth bone of the metatarsus.

Metatarsus is also the assemblage of small bones articulated to the tarsus at one end, and to the toes at the other.

METATHESIS, in grammar, a species of the metaplasmus; being a figure whereby the letters or syllables of a word are transposed, or shifted out of their usual situation, as *pistris* for *pristis*, *lybia* for *libya*, &c. See METAPLASMUS.

This word is, by physicians, used with respect to morbid causes; which, when they cannot be evacuated, are removed to places where they are less injurious.

METEMPSYCHOSIS, the doctrine of transmigration, which supposes that human souls, upon their leaving the body, become the souls of such kind of brutes as they most resemble in their manners.

This was the doctrine of Pythagoras and his

his followers, who held that the souls of vicious men were imprisoned in the bodies of miserable beasts, there to do penance for several ages, at the expiration whereof they returned again to animate men; but if they had lived virtuously, some happier brute, or even a human creature, was to be their lot. What led Pythagoras into this opinion was the persuasion he had that the soul was not of a perishable nature; whence he concluded, that it must move into some other body upon its abandoning this. Lucan thinks this doctrine was contrived to mitigate the apprehension of death, by persuading men that they only changed their lodgings, and ceased to live only to begin a new life. Reuchlin denies this doctrine, and maintains, that the metempsychosis of Pythagoras implied nothing more than a similitude of manners and desires formerly existing in some person deceased, and now reviving in another alive. Pythagoras is said to have borrowed the notion of a metempsychosis from the Egyptians; others say from the antient brachmans. It is still retained among the antient bani-ans, and other idolaters of India and China, and makes the principal foundation of their religion. Many of the modern Jews are said to espouse this doctrine, and to support their opinion quote these words of Job, "Lo all these things
"worketh God oftentimes with man
" (in hebrew, *and thrice*) to bring back
"his soul from the pit to be enlightened
"with the light of the living." It is certain, that at the time of Jesus Christ this opinion was very common among the Jews: this appears in the Gospel, when they say that some thought Jesus Christ to be John the Baptist, others Elias, others Jeremiah, &c.

METEMTOSIS, a term in chronology, expressing the solar equation, necessary to prevent the new moon from happening a day too late, by which it is opposed to proemptions, which signifies the lunar equation necessary to prevent the new moon from happening a day too soon. The new moon's running a little backward, that is, coming a day too soon, at the end of three hundred twelve years and a half; by the proemptions a day is added every three hundred years, and another every two thousand four hundred years. On the other hand, by the metemptions, a bissextile is suppressed every one hundred and thirty-four years; that is, three times in four hundred years.

These alterations are never made but at the end of each century; that period being very remarkable, and rendering the practice of the calendar easy.

There are three rules for making this addition or suppression of the bissextile day, and by consequence for changing the index of the epacts. 1. When there is a metemptions without a proemptions, the next following, or lower index, must be taken. 2. When there is a proemptions without a metemptions, the next preceding, or superior index is to be taken. 3. When there are both a metemptions and proemptions, or when there is neither the one nor the other, the same index is preserved.

METEOR, in physiology, an imperfect, changeable, and mixt body, or the resemblance of a body appearing in the atmosphere, and formed by the action of the heavenly bodies, out of the common elements.

Meteors are of three kinds, fiery, airy and watery. Fiery meteors consist of a fat sulphureous smoke set on fire; such as lightning, thunder, falling stars, dracolans, the ignis fatuus, and other phenomena, appearing in the air. Airy meteors consist of flatulent and spirituous exhalations, such as winds, &c. Watery meteors are composed of vapours; or watery particles, variously modified by heat and cold, such as clouds, rain, hail, snow and dew. See the articles LIGHTENING, WIND, HAIL, &c.

Dr. Woodward supposes that the matter of which many of the meteors are formed, is in a great measure of a mineral nature; and that the mineral particles contained in the strata of the earth, are raised by the subterraneous heat, together with the vapours ascending from the abyss and pervading those strata, especially at such times as the sun's heat is sufficient to penetrate the exterior parts of the earth, and to make room for their escape into the atmosphere. These sulphureous, nitrous, and other active and volatile mineral particles, form various meteors, particularly thunder, lightning, and the other phenomena of a fiery nature. See EXHALATIONS, DAMPS, &c.

METHEGLIN, a drink prepared of honey, one of the most pleasant and general drinks the northern parts of Europe afford. It is, according to Baily, made as follows: put as much new honey, naturally running from the comb, into spring-water, as that, when the honey is thoroughly

roughly dissolved, an egg will not sink to the bottom, but be just suspended in it. Then boil the liquor for an hour or more, till such time as the egg swim above the liquor; then take it off the fire, and let it cool. When very cool, next morning, it may be barrelled up; and adding to it half an ounce of ginger, as much of cloves, as much of mace, and a quarter of an ounce of cinnamon, all grossly pounded, a spoonful of yeast may be added also at the bung to increase its fermentation. When it has done working, it may be closely stopped up, and after it has stood a month it may be drawn off into bottles.

Metheglin, on its importation, pays a duty of 7 s. 8 $\frac{4}{100}$ d. the hoghead: and draws back, on exportation, 6 s. 9 d.

METHOD, *methodos*, in logic, &c. the arrangement of our ideas in such a regular order, that their mutual connection and dependence may be readily comprehended. See **IDEA** and **KNOWLEDGE**. The doctrine of method makes one of the subdivisions of logic, which is always placed last in order, because it supposes a previous exercise of our other faculties of perception, judgment and reasoning, and some progress made in knowledge before we can exert it in any extensive degree. See the articles **PERCEPTION**, **INTUITION**, **JUDGMENT**, and **REASONING**.

The proper business, therefore, of method, is to distribute our ideas into various classes, combining into a regular system whatever relates to one and the same subject, to ascertain the various divisions of human knowledge, and so to connect the parts in every branch that they may seem to grow one out of another, and form a regular body of science, rising first from principles, and proceeding by an orderly concatenation of truths. In this view of things it is plain, that we must be before hand well acquainted with the truths we are to combine together; otherwise we could neither discern their several connections and relations, nor so dispose of them as their mutual dependence may require.

But it often happens, that the understanding is employed, not in the arrangement and composition of known truths, but in the search and discovery of such as are unknown: and here the manner of proceeding is very different, inasmuch as we assemble at once our whole stock of knowledge relating to any subject, and after a general survey of things, begin with ex-

amining them separately and by parts; and when, by such a scrutiny, we have thoroughly informed ourselves of the nature and contexture of each, we then compare them together in order to judge of their mutual action and influence.

Hence it appears, that in disposing and putting together our thoughts, either for our own use, that the discoveries we have made may at all times lie open to the review of the mind, or where we mean to unfold and communicate these discoveries to others, there are two methods of proceeding equally within our choice: for we may so propose the truths relating to any part of knowledge, as they presented themselves to the mind in the manner of investigation, carrying on the series of truths in a reverse order, until they at last terminate in first principles; or beginning with first principles, we may take the contrary way, and from them deduce, by a direct train of reasoning, the several propositions we want to establish. The former of these methods is termed, by logicians, the analytic method, or the method of resolution, in as much as it traces things backward to their source, and resolves knowledge into its first and original principles. The latter constitutes what is called the synthetic method, or the method of composition; because here we proceed by gathering together the several scattered parts of knowledge, and combining them into one whole or system, in such a manner that the understanding is enabled distinctly to follow truth through all her different stages and gradations.

There is this farther to be taken notice of in relation to these two kinds of method, that the analytic has also obtained the name of the method of invention; because it observes the order in which our thoughts succeed one another in the invention or discovery of truth: whereas the synthetic is often denominated the method of doctrine or instruction, inasmuch as in laying our thoughts before others, we generally choose to proceed in this manner, deducing them from their first principles. For we are to observe, that although there is great pleasure in pursuing truth in the method of investigation, because it places us in the condition of the inventor, and shews the particular train of thinking by which he arrived at his discovery, yet it is not so well accommodated to the purposes of evidence and conviction, since, at our first setting out, we are commonly unable to divine where

the analysis will lead us; and even after light begins to break in upon us, we are still obliged to many reviews, and a frequent comparison of the several steps of the investigation among themselves: nay, when we have unravelled the whole, and reached the very foundation on which our discoveries stand, all our certainty, in regard to their truth, will be found, in a great measure, to arise from that connection we are now able to discern between them and first principles, taken in the order of composition. But in the synthetic method of disposing our thoughts the case is quite different: for as we here begin with intuitive truths, and advance by regular deductions from them, every step of the procedure brings evidence and conviction along with it; so that in our progress from one part of knowledge to another, we have always a clear perception of the ground on which our assent rests. In communicating, therefore, our discoveries to others, this method is apparently to be chosen, as it wonderfully improves and enlightens the understanding, and leads to an immediate perception of truth: and hence it is called the method of science, because all the parts of knowledge, which properly bear the name of sciences, are and ought to be delivered in it. See the article SCIENCE.

In order to proceed successfully in the analytic method, we must endeavour, as much as possible, to enlarge the capacity of the mind, by accustoming it to wide and comprehensive views of things; we must also habituate ourselves to a strong and unshaken attention, which carefully distinguishes all the circumstances that come in our way, and lets nothing material slip its notice; in fine, we must furnish ourselves with an ample variety of intermediate ideas, and be much in the exercise of singling them out and applying them for the discovery of truth. These preparatory qualifications obtained, what further depends upon us lies chiefly in the manner of combining our perceptions, and classing them with address; and here the advantages of a proper notation are very great. See NOTATION, ANALYSIS, &c.

With respect to the synthetic or scientific method, the great secret lies in so managing and conducting our thoughts, as that their several relations may be laid open to the view of the understanding, and become the unavoidable objects of

our perception. In order to this, we must make it our first care distinctly to frame and settle the idea, about which our enquiries are to be employed: for as the relations subsisting between them can no otherwise be discerned, than by comparing them one with another; and as this comparison necessarily supposes, that the ideas themselves are actually in the mind, and at that very time under our immediate inspection; it plainly follows, that all science must begin with fixing and ascertaining those ideas. See IDEA. By this means alone, are these our more intricate notions kept distinct and invariable; insomuch, that in all our several views of them, they ever have the same appearance, and exhibit the same habits and respects. And here, properly speaking, the art of knowledge begins: for although we find it easy enough to bound and settle our ideas, where they consist of but a few perceptions, yet when they grow to be very complicated, it often requires great address and management to throw them into such views as may prevent the confusion that is apt to arise from the joint consideration of a multiplicity of objects. To remedy this inconvenience, the synthetic method teaches us to dispose our perceptions into classes, serieses and genera: and as in advancing from one degree to another, we are always to proportion the number of notices united, to the strength and capacity of the mind, it is apparent, that by such a procedure, the ideas will be thoroughly ascertained in every step, and however large and bulky, lie nevertheless fairly within our grasp. This obviously accounts for that wonderful clearness of apprehension which we often experience within ourselves, even in regard to the most complicated conceptions: for tho' the multitude of parts, in many cases, be great, almost beyond belief, yet as they have all previously been formed into separate classes and subdivisions, all distinctly settled in the understanding, we find it easy by such a series of steps to rise to any idea, how complex soever, and with a single glance of thought embrace it in its full extent. See the articles CLASS, GENUS, &c.

But it is not enough that we barely form ideas in our minds; we must also contrive a way not only to make them stable and permanent, so as to be able to recollect them with ease and certainty, but also to unfold

unfold them to others; which is best done by well defined words. See the articles **WORD** and **DEFINITION**.

This foundation being laid, the communication of our complex conceptions, by definitions, becomes both easy and certain: for since the ideas themselves are formed into different orders, and these orders arise continually out of those combinations that constitute the classes next below them, so the definitions corresponding to these different orders, gradually take in the terms by which the several inferior divisions are regularly and successively expressed. In such a series of descriptions, it is evident, at first sight, that nothing can be obscure and unintelligible. For as it begins with the names of simple ideas, whose meaning is supposed to be known; and as in every order of definitions, such terms only occur as have been previously explained in the preceding distributions; by advancing regularly from one to another, we gradually furnish ourselves with whatever is necessary towards a distinct conception of all that is laid before us. Nor is it a small advantage attending this disposition, that the several ideas described are hereby excited in the understanding, in the very order and manner in which they are framed by a mind, advanced uniformly from simple to the most complicated notions. Hence we see distinctly the various dependence of things, and being put into that very train of thinking, which leads directly to science and certainty, are drawn insensibly to interest ourselves in the pursuit; insomuch that while in fact we do no more than follow a guide and conductor, we can yet hardly forbear fancying ourselves engaged in the actual exercise of deducing one part of knowledge from another.

When we have thus fixed and ascertained our ideas, and distinctly exhibited them in definitions, we then enter upon the important task of tracing their several relations; in order to which, we set about comparing them among themselves, and viewing them in a variety of lights; and here it happens, that some relations forwardly offer themselves to the notice of the understanding, and become the necessary objects of perception, upon the very first application of our ideas to one another; and, consequently, constitute our primary and intuitive judgments, being attended with the highest degree of evidence, and producing absolute cer-

tainty in the mind. But in many cases, the connection or repugnance between our ideas, even when real, comes not within our immediate view, but requires search and examination to discover it; and hence arises the necessity of reasoning and demonstration. See the articles **REASONING**, **DEMONSTRATION**, &c.

But what is particularly elegant and happy in the method above explained, we hereby see knowledge rising out of its first elements, and discern distinctly how those elements are interwoven, in order to the erecting a goodly superstructure of truth. Experience furnishes us with simple ideas and their names, which are the primary materials of thinking and communication. Definitions teach how to unite and bind these ideas together, so as to form them into complex notions of various orders and degrees. Intuitive truths constitute the fundamental principles of all knowledge, and the ultimate ground of certainty. Demonstrations link known truths together, in such a manner, that they necessarily lead to others unknown. Thus are we gradually led from simple ideas, through all the windings and labyrinths of truth, until we at length reach the most exalted discoveries of human reason. It is true, the method here laid down, hath hitherto been observed strictly, only among mathematicians; and is therefore, by many, thought to be peculiar to number and magnitude. But it appears evidently from what we have said above, that it may be equally applied in all such other parts of knowledge as regard the abstract ideas of the mind, and the relations subsisting between them.

As to the method to be observed in judging of the historical and experimental parts of our knowledge, see **HISTORY** and **EXPERIMENTAL PHILOSOPHY**.

The methods also of fluxions, of the differential calculus, of tangents, of finding the maximum, &c. may be seen under the articles **FLUXION**, **CALCULUS DIFFERENTIALIS**, &c.

METHODISTS, a name at first given to a society of religious young men at Oxford, and now applied to all those who adhere to the doctrine of the church of England as taught by Whitefield, Wesley, &c. They are said to be, in general, plain well-meaning people, who do not dissent from the established church; but profess to live with great purity, according to her articles. At their first appear-

ance their teachers were charged, in the heat of their zeal, with several irregularities, and many expressions in their preaching which were not altogether unexceptionable; but as the civil government, with a moderation and wisdom peculiar to the present time, thought fit to overlook their behaviour, they have since honestly acknowledged wherein they were mistaken; and, in consequence of the perfect liberty of conscience they enjoy, have subsided into a more regular and peaceable conduct, agreeable to the genuine spirit of christianity.

METHODISTS, *Methodici*, is also an appellation given a sect of antient physicians, who reduced the whole healing art to a few common principles or appearances. See the article **PHYSICIANS**.

They were also called *Theffalici*, as being the followers of *Theffalus*. Galen strenuously opposed them, and scrupled not to assert that the methodical heresy ruined every thing good in the art of physic.

METHODISTS, among botanists, *Linnæus* defines to be those persons who have attempted the study of botany upon certain principles, and have bestowed their labours upon the disposition and arrangement of plants, and allotting them proper and distinctive names.

METOCHE, in antient architecture, a term used by *Vitruvius* to signify the space or interval between the dentils. See the article **DENTIL**.

METONIC CYCLE, in chronology, the same with the cycle of the moon. See the article **CYCLE**.

METONYMY, in rhetoric, is a trope in which one name is put for another, on account of the near relation there is between them. By this trope any of the most significant circumstances of a thing are put for the thing itself. The metonymy is used with most advantage in the following cases. 1. When the narration stands for the action, and what the poet or historian describes, he is said to do; which is a lively manner of expression, exceeding the common, as much as action goes beyond description, or life excels painting. 2. When the name of any relation is put for the duty it requires, and the benevolence and tenderness that may be expected from it. Thus *Anacreon* says, that thro' money there is no longer any such thing as brethren or parents in the world. 3. When the word which is used for a proper

name, is either taken from the person's country, family, profession, personal circumstance, or resemblance to some other; thus, as *Sardanapalus* was a monster of debauchery, and *Nero* of cruelty, to call a very debauched person a *Sardanapalus*, and a cruel one *Nero*, brands them much deeper than to call one debauched, and the other cruel.

METOPE, *metopa*, in architecture, is the interval, or square space between the triglyphs of the doric frieze, which among the antients used to be painted or adorned with carved work, representing the heads of oxen, or utensils used in sacrifices.

Mr. Le Clerc says, that the beauty of metopes consists in their regularity, that is, in their appearing as perfect squares. He also observes, that when the triglyphs and metopes follow each other regularly, the columns must stand one by one, except those of the inner angles, which ought always to be accompanied with two others, one on each side; from which the rest of the columns may be placed at equal distances from each other.

Semi-METOPE, in architecture, is a space in the corner of the doric frieze, somewhat less than half a metope.

METOPOSCOPY, the pretended art of knowing a person's dispositions and manners, by viewing the traces and lines in the face. *Ciro Spontoni*, who has wrote expressly on metoposcopy, says, that seven lines are examined in the forehead, and that each line is considered as having its particular planet: the first is the line of Saturn, the second of Jupiter, the third of Mars, &c. Metoposcopy is only a branch of physiognomy, which founds its conjectures on all the parts of the body. See **PHYSIOGNOMONICS**.

METRE, *μετρα*, in poetry, a system of feet of a just length. See **NUMBERS**.

The different metres in poetry, are the different manners of ordering and combining the quantities, or the long and short syllables; thus hexameter, pentameter, iambic, sapphic verses, &c. consist of different metres, or measures. See **HEXAMETER**, **PENTAMETER**, &c.

In english verses, the metres are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleases. The most usual are the heroic, generally consisting of five long and five short syllables, and verses of four feet, and of three feet, and a caesura,

fora, or single syllable. See the articles SYLLABLE and CÆSURA.

The antients, by variously combining and transposing their quantities, made a vast variety of different measures, by forming spondees, &c. of different feet. See the article FOOT.

METRETES, an antient measure of capacity, containing a little more than nine gallons.

METRICAL, something relating to metre. See the article METRE.

METROCOMIA, in church-history, a borough, or village, which had other villages under its jurisdiction; being the same among villages, that a metropolis is among cities. See the following article.

METROPOLIS, the capital or principal city of a country or province.

The term metropolis is also applied to archiepiscopal churches, and sometimes to the principal or mother church of a city. The Roman empire having been divided into thirteen dioceses, and one hundred and twenty provinces, each diocese and each province had its metropolis, or capital city, where the proconsul had his residence. To this civil division, the ecclesiastical was afterwards adapted, and the bishop of the capital city had the direction of affairs, and the preheminance over all the bishops of the province. His residence in the metropolis gave him the title of metropolitan. This erection of metropolitans is referred to the end of the third century, and was confirmed by the council of Nice. A metropolitan has the privilege of ordaining his suffragans; and appeals from sentences passed by the suffragans, are preferred to the metropolitan.

METROPOLITAN. See the article METROPOLIS.

METZ, a city of Germany, in the dutchy of Lorrain, capital of the bishopric of Metz, situated thirty miles north of Nancy.

MEVAT, a province of India in Asia, north of Bengal, having the river Ganges on the west.

MEULUN, a town of France, situated on the river Seyne, fifteen miles north-west of Paris.

MEURS, a town of Germany, in the circle of Westphalia, and dutchy of Cleve, situated on the river Rhine, fifteen miles north of Dusseldorp.

MEW, a place where a hawk is set, during the time she raises her feathers.

MEWING, the falling off, or change of

hair, feathers, skin, horns, or other parts of animals, which happens in some annually, in others only at certain stages of their lives; but the generality of beasts mew in the spring. An old hart casts his horns sooner than a young one, which is commonly in the months of February and March, after which they begin to button in March or April; and as the sun grows strong, and the season of the year puts forth the fruits of the earth, so their heads grow, and are summed full by the middle of June. It is to be observed, that if a hart be gelt before he has a head, he will never have any, and if he be gelt after he has a head, he will never cast his horns; again, if he be gelt when he has a velvet-head, it will always be so, without fraying, or burnishing.

MEXICO, the metropolis of New Spain, at present, and formerly of the empire of Mexico, situated in west long. 103° , north lat. 20° .

This province of New Spain in America, is now divided into Old and New Mexico.

Old MEXICO, situated between 83 and 116 degrees of west long. and between 8 and 28° north lat. is bounded by New Mexico, or Granada, on the north; by the gulph of Mexico on the north-east; by Terra-firma on the south-east; and by the Pacific Ocean on the south-west.

New MEXICO, including California, situated between 100 and 140 degrees of west long. and between the Tropic of Cancer and 48 degrees of north lat. is bounded by unknown lands on the north; by Florida on the east; by Old Mexico on the south; and by the Pacific Ocean on the west.

MEZIERES, a town of France, in the Province of Champaign, situated on the river Maes, in east longitude 4° , latitude $49^{\circ} 55'$.

MEZZOTINTO, a particular manner of representing figures on copper, so as to form prints in imitation of painting in indian ink.

The manner of making mezzotintos is very different from all other kinds of engraving and etching, since instead of forming the figures with lines and scratches made with the point of a graver, or by means of aquafortis, they are wholly formed by scraping and burnishing. Mezzotintos are made in the following manner: take a well-polished copper-plate, and beginning at the corner, rake or fur-

row

row the surface all over with a knife or instrument made for the purpose, first one way, and then the other, till the whole is of a regular roughness, without the least smooth part to be seen; in which state, if a paper was to be worked off from it at the copper-plate press it would be all over black. When this is done, the plate is rubbed over with charcoal, black chalk, or black lead, and then the design is drawn with white chalk, after which the out-lines are traced out, and the plate finished by scraping off the roughness, so as to leave the figure on the plate. The out-lines and deepest shades are not scraped at all, the next shades are scraped but little, the next more, and so on, till the shades gradually falling off, leave the paper white, in which places the plate is neatly burnished.

By an artful disposition of the shades, and different parts of a figure on different plates, mezzotintos have been printed in colours, so as nearly to represent very beautiful paintings.

MIASMA, among physicians, denotes the contagious effluvia of pestilential diseases, whereby they are communicated to people at a distance. See the articles **CONTAGION**, **PLAGUE**, &c.

MICA, **GLIMMER**, in natural history, a genus of talcs, otherwise called bractearium. See **BRACTEARIA**.

The bright appearance of the gold and silver glimmers, has led some to imagine, they were gold and silver ores; but the truth is, they contain not the least grain of either of these metals, being mere talc, accidentally coloured. See **TALC**.

MICAH, or the *Book of MICAH*, a canonical book of the Old Testament, written by the prophet Micah, who is the seventh of the twelve lesser prophets. He is cited by Jeremiah, and prophesied in the days of Jotham, Ahaz, and Hezekiah. He censures the reigning vices of Jerusalem and Samaria, and denounces the judgments of God against both kingdoms. He likewise foretells the confusion of the enemies of the Jews, the coming of the Messiah, and the glorious success of his church.

MICHAEL, or *Mount St. MICHAEL*. See the article **MOUNT**.

MICHAELMAS, or *Feast of St. MICHAEL and all Angels*, a festival of the christian church, observed on the 29th of September.

MICHELIA, in botany, a genus of the

oelandria-polygynia class of plants, the flower of which consists of eight acute lanceolated petals, less than the cup: the fruit consists of a number of globose unilocular berries, disposed in a cluster; in each of which there are four seeds, convex on one side, and angular on the other.

MICROCOS, in botany, a genus of the polyandria-monogynia class of plants, the calyx of which is a five leaved perianthium; the corolla consists of five very small leaves; the fruit is a roundish drupe, with one cell, in which is a bony, turbinate, fibrous seed.

MICROCOSM, μικροκοσμος, a greek term, signifying the little world; used by some for man, as being supposed an epitome of the universe, or great world.

MICROGRAPHY, μικρογραφια, the description of objects, too minute to be viewed without the assistance of a microscope. See the article **MICROSCOPE**.

MICROLEUCONYMPHÆA, in botany, the same with the hydrocharis. See the article **HYDROCHARIS**.

MICROMETER, an astronomical machine, which, by means of a screw, serves to measure extremely small distances in the heavens, &c. and that to a great degree of accuracy.

The micrometer consists of a graduated circle, (plate CLXXI. fig. 5.) of a screw *qo*, and its index *qr*. The threads of the screw are such, that 50 make the length of one inch exactly. When it is to be used, the point *o* is set to the side of the part to be measured, and then the index is turned about with the finger, till the eye perceives the point has just passed over the diameter of the part; then the number of turns, and parts of a turn, shewn by the graduated circle, will give the dimensions in parts of an inch, as we shall shew by the following example: Suppose it required to measure the diameter of an human hair, and I observe the index is turned just once round, while the point *o* passes over it. Then it is plain the diameter of the hair in the image is $\frac{1}{50}$ of an inch. Now if the microscope, *I D E F d e f*, magnifies 6 times, or makes the image 6 times larger in diameter than the object, then is the diameter of the hair itself but $\frac{1}{6}$ of $\frac{1}{50}$, that is, but $\frac{1}{300}$ part of an inch.

Also it is to be observed, that as there are 10 large divisions, and 20 small ones, on

on the micrometer-plate, so each of those small divisions are the $\frac{1}{20}$ of $\frac{1}{50}$, or the $\frac{1}{1000}$ part of an inch. Therefore, if, in measuring any part of an object, you observe how many of these smaller divisions are passed over by the index, you will have so many thousandth parts of an inch for the measure required. All which is so plain, that nothing can be said to illustrate the matter.

MICROPUS, in botany, a genus of the *syngenesia polygamia necessaria* class of plants, with a paleaceous receptacle, but no pappus or down to the seeds; and the corolla is of the naked kind, or has no radius: the flowers are small, and stand on the extremities of the branches.

MICROSCOPE, an optical instrument, by means whereof very minute objects are represented, exceedingly enlarged, and are viewed very distinctly according to the laws of refraction, or reflection. See **REFRACTION** and **REFLECTION**.

Microscopes are either single or double; a single microscope is only a very small globule of glass, or a small double convex glass, whose focal distance is very short. A minute object $p q$ (plate CLXXII. fig. 1. n^o 1.) seen distinctly through a small glass A E by the eye put close to it, appears so much greater than it would to the naked eye, placed at the least distance $q L$ from whence it appears sufficiently distinct, as this latter distance $q L$ is greater than the former $q E$. For having put your eye close to the glass E A, in order to see as much of the object as possible at one view, remove the object $p q$ to and fro till it appears most distinctly, suppose at the distance E q . Then conceiving the glass A E to be removed, and a thin plate, with a pin-hole in it, to be put in its place, (*ib.* n^o 2.) the object will appear distinct, and as large as before, when seen through the glass, only not so bright. And in this latter case, it appears so much greater than it does to the naked eye, at the distance $q L$, either with the pin-hole or without it, as the angle $p E q$ is greater than the angle $p L q$, or as the latter distance $q L$ is greater than the former $q E$. Since the interposition of the glass has no other effect than to render the appearance distinct, by helping the eye to increase the refraction of the rays in each pencil, it is plain that the greater apparent magnitude is entirely owing to a nearer view than could be taken by the naked eye. If the eye be so perfect as to see distinctly by pencils of

parallel rays falling upon it, the distance, E q , of the object from the glass, is then the focal distance of the glass. Now if the glass be a small round globule whose diameter is $\frac{1}{15}$ of an inch, its focal distance E q being three quarters of its diameter, is $\frac{1}{20}$ of an inch; and if $q L$ be eight inches, the usual distance at which we view minute objects, this globule will magnify at the rate of 8 to $\frac{1}{20}$ or of 160 to 1.

In microscopes made with single lenses, a given object placed at their principal focuses will appear equally distinct, if their linear apertures be as their focal distances. And in microscopical lenses, whose focal distances are not much longer than half an inch, there is no need to contract their apertures, for procuring distinct vision; the pupil itself being small enough to exclude the exterior straggling rays. But in smaller lenses, where apertures are necessary, to preserve the same degree of distinctness, their diameters must be as their focal distances; and then the apparent brightness will decrease in a duplicate ratio of their focal distances, so that by using smaller glasses the apparent magnitude and the obscurity of the object will both increase in the same ratio.

A double microscope is composed of two convex glasses placed at E and L. (*ibid.* fig. 2.) The glass L next the object P Q is very small and very much convex, and consequently its focal distance L F is very short; the distance L Q of the small object P Q, is but a little greater than L F; so that the image $p q$, may be formed at a great distance from the glass, and consequently may be much greater than the object itself. This picture $p q$ being viewed through a convex eye-glass A E, whose focal distance is $q E$, appears distinct. Now the object appears magnified upon two accounts; first, because if we viewed its picture $p q$ with the naked eye, it would appear as much greater than the object, at the same distance, as it really is greater than the object, or as much as L q is greater than L Q; and secondly, because this picture appears magnified through the eye-glass as much as the least distance at which it can be seen distinctly with the naked eye, is greater than $q E$, the focal distance of the eye-glass. For example, if this latter ratio be 5 to 1, and the former ratio of L q to L Q be 20 to 1, then upon both accounts the object

object will appear 5 times 20, or 100 times greater than to the naked eye.

To fit these microscopes to short-sighted eyes, the glasses E and L must be placed a little nearer together; so that the rays of each pencil may not emerge parallel, but may fall diverging upon the eye; and then the apparent magnitude will be altered a little, but scarce sensibly.

To make glass globules for MICROSCOPES.

Mr. Butterfield, in the Philosophical Transactions, n^o 141, says, he had tried several ways of making glass-globules of the bigness of great pin-heads and less, as in the flame of a candle made of tallow or wax; but that the best sort of flame for making them clear and without specks, was that of a lamp made with rectified spirit of wine, where instead of a cotton wick, he made use of fine silver-wire, doubled up and down like a skein of thread. Then having prepared some fine glass, beaten to powder and washed very clean, he took a little of it upon the sharp point of a silver-needle wetted with spittle, and held it in the flame, turning it about till it melted and became quite round, but no longer, for fear of burning it. The art lies in giving the globule an exact roundness, which can only be learned by experience. When a great many globules are thus formed, he rubs them clean with a soft leather. Then having several small pieces of thin brass-plates, twice as long as they are broad, he doubles them up into the form of a square, and punches a fine hole through the middle of them: and having rubbed off the bur about the holes with a whetstone, and blacked the insides of the plates with the smoke of a candle, he places a globule between the two holes, and tacks the plates together with two or three rivets. Then he tries how they magnify small objects; and keeps the best of them for use.

Dr. Hook used to take a very clear piece of glass, and to draw it out into long threads in a lamp; then he held these threads in the flame till they run into round globules hanging to the end of the threads. Then having fixt the globules with sealing wax to the end of a stick, so that the threads stood upwards, he ground off the ends of the threads upon a whetstone, and polished them upon a smooth metal-plate with a little putty.

Mr. Stephen Gray, in the Philosophical Transactions, n^o 221, 223, says, that for want of a spirit-lamp, he laid a small

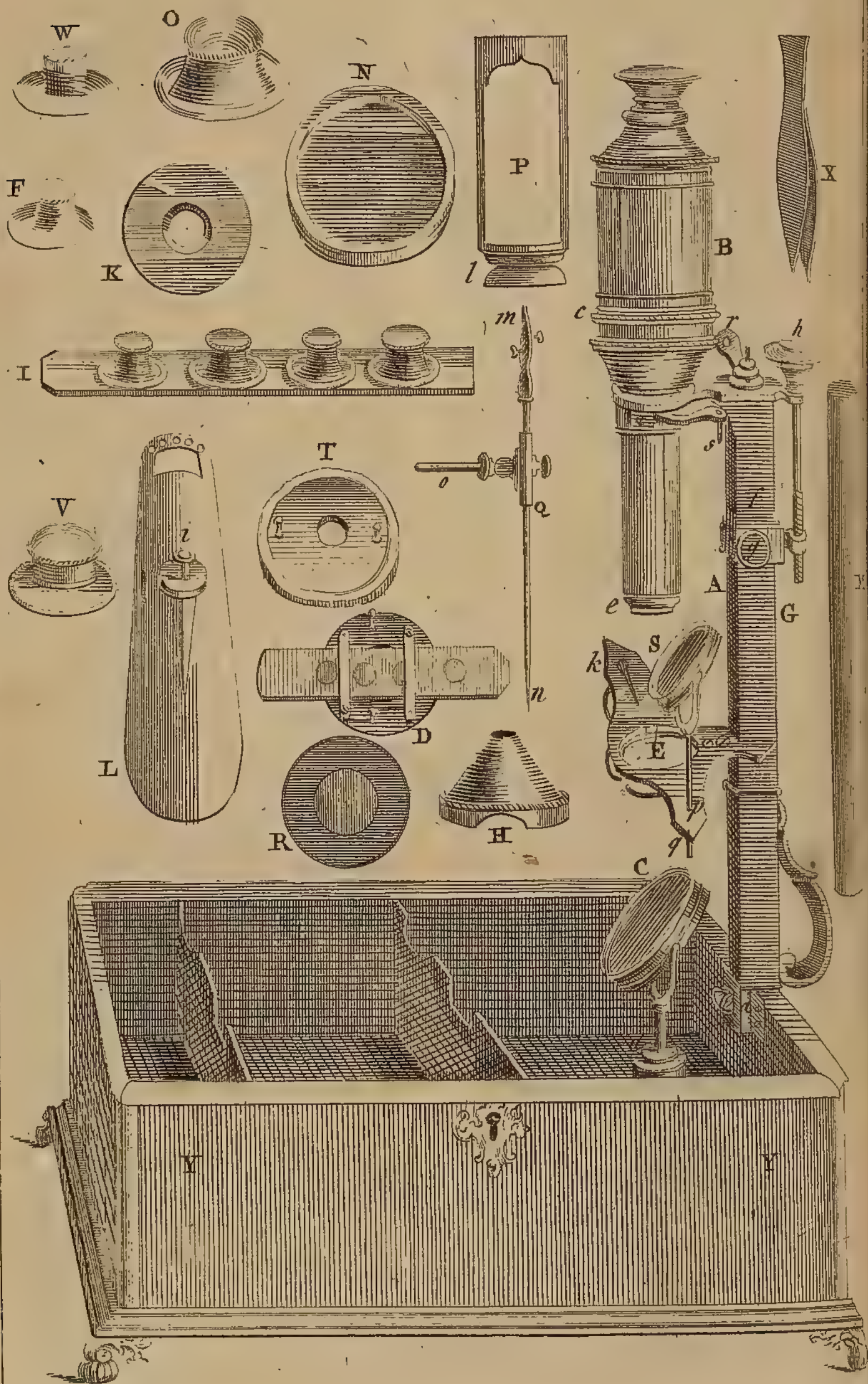
particle of glass, about the bigness of the intended globule, upon the end of a charcoal; and by the help of a blast-pipe, with the flame of a candle, he soon melted it into a globule. By this means he made them indifferently clear, and the smallest very round; but the larger, by resting upon the coal, were a little flatted, and received a roughness on that side. Therefore he was wont to grind and polish them upon a brass plate, till he reduced them to hemispheres. But he found that the small round globules, besides that they magnified more, shewed objects more distinct than the hemispheres.

Mr. Wilson's pocket-microscope, has nine different magnifying glasses, eight of which may be used with two different instruments, for the better applying them to various objects. One of these instruments is represented by A A B B (*ibid.* fig. 3. n^o 1.) and is made of ivory or brass; it has three thin brass-plates at E, and a spiral spring of steel-wire H within it; to one of the thin plates of brass is fixed a piece of leather F, with a small furrow G both in the leather and brass to which it is fixed: in one end of this instrument is a long screw D, with a convex glass C, placed in the end of it: in the other end of the instrument there is a hollow screw *o o*; wherein any of the magnifying glasses, M, (*ib.* n^o 2.) are screwed when they are to be made use of. The nine different magnifying glasses are all set in ivory, eight of which are set in the manner expressed at M. The greatest magnifier is marked upon the ivory wherein it is set, with n^o 1. and so on to n^o 8; the ninth glass is not marked, but is set in the manner of a little barrel-box of ivory, as at *b.* (*ib.* n^o 3.) At *ee*, is a flat piece of ivory, (*ib.* n^o 4.) whereof there are eight belonging to this microscope, tho' any one may have as many as he pleases; in each of them are three holes *fff*, wherein three or more objects are placed between two thin glasses, or pieces of talc, when they are to be used with the greater magnifiers.

The use of this instrument A A B B is this: having taken the handle W from the instrument (*ib.* n^o 5.) and screwed it upon the button S in n^o 1. take one of your flat pieces of ivory *ee*, or sliders, and slide it betwixt the two thin plates of brass at E, through the body of the microscope, so that the object you intend to look upon be just in the middle; re-

marking

Ayscough's Single and Compound MICROSCOPE, for viewing both transparent and opaque Objects.



marking that you put that side of the plate *ee*, where the brass rings are, farthest from the end *AA*: then you are to screw into *oo* (the hollow screw in the end of your microscope) the 3d, 4th, &c. magnifying glass *M*; which being done, put the end *AA* close to your eye, and while you are looking through your magnifying glass upon the object, you are to screw in or out the long screw *D*, which moving round upon the leather *F*, held tight to it by the spiral wire *H*, will bring your object to the true distance; which you will know by seeing it clearly and distinctly: after this manner may be seen all transparent objects, dusts, liquids, crystals of salts, small insects, &c.

The other instrument (*ib.* 5.) is made of brass, with joints *PPP* to turn easily any way, and with a small pair of tongs *GG*, which open at the points *K*, by pressing together the two heads of the pins *II*, for taking up of objects. At the other end of these tongs *GG*, is screwed on a piece of black wood *H*, with a piece of ivory set into it, for placing opaque objects on, according to their difference of colour. Upon the end *L* there is a screw, upon which the glass *b* (*n*° 3.) set in the barrel-box, may be screwed. When the other glasses are to be used, there is a ring *R* of brass to be screwed on the end *L*, into which ring all the other glasses *M*, may be screwed. So when any object is taken up in the point of the tongs *K*, or laid upon the other end *H*, it may very easily be applied to the true focal distance of any of the glasses *M*, by the help of the joints *PPP*, and by means of the screw *C*, with the wheel *D*, which being regulated by a spring *N*, will bring the objects to the exact distance for distinct vision.

The glass placed in the manner of a barrel-box at *b*, (*ib.* *n*° 3.) is only to be used with the brass-instrument, or in your own hand; being the least magnifier, for greater objects, such as flies and common insects, &c. remembering to put the hole *b* next to your eye.

The ingenious Mr. Aylcough has contrived a microscope, which may be used either with a single or with compound lenses, and that for opaque as well as transparent objects.

Being taken out of the box *YY*, and fitted for observation, it stands as in plate *CLXXIII*. the bottom of the pillar *A* being fixed in the socket *a*, and

fastened by the screw *b*; the body of the microscope, *B*, fixed in the collar *c*; and the illuminator, *C*, placed underneath the stage at *d*.

If an object in an ivory-slider is to be viewed, the apparatus *D* is to be fixed in the center of the stage *E*. This done, such a magnifier, *F*, as is most proper in proportion to the size of the object, is to be applied to the end of the tube *e*: suppose the magnifier *n*° 1. be used, the upper edge of the collar *f* must be set to the same number on the pillar *A*; and if not perfectly distinct, the button *g* must be screwed tight; and then, by a turn or two of the button *h*, it is adjusted to the focus with the greatest exactness: and so of the other magnifiers. But when the object is placed above or beneath the stage, no regard must be had to the number on the pillar *A*; but the pillar *G*, that carries the object, is to be moved higher or lower, till the object is seen nearly distinct, and then it is to be adjusted as before.

Whenever the 1st, 2d, or 3d magnifier is used, the cone *H* must be placed at the bottom of the stage, whereby the object is rendered much more distinct. And to save the trouble of often screwing and unscrewing the magnifiers, let three or four of them be screwed to the plate *I*, which slides in the dove-tail of the plate *K*. If the object to be viewed be a fish, place its tail over the hole at the end of the brass plate *L*; and then by flipping the button *i* into the slit *k* on the stage, it will be fixed under the bottom of the microscope. Frogs, &c. must be placed in the glass tube *M*. The brass-cup *N*, with a glass-bottom, is made to contain any fluid for viewing aquatic objects: and to secure any object for observation, confine it between the glasses in the box *O*.

These are the parts for viewing transparent objects; and those for opaque ones are a silver-speculum, which screws into the end of the brass-cylinder *P*, at *l*: and here the fourth, fifth, and sixth, are the most proper magnifiers. Most insects may be confined by the forceps *m*, at the end of the steel-wire *Q*; or, on the point *n*. To view objects by candle-light, place them on the piece *R*, which must be laid on the stage, where they will be illumined by the lens *S*, supported by the stem *p q*.

The method of using this microscope with single lenses, is this: the body of

the compound microscope must be taken out of its collar *c*, and the apparatus D placed in the same; the stem, *r*, must be turned over the stage, to support the magnifiers; the brass plate T, with a hole to receive the illuminator, C, must be fixed in the center of the stage; all the magnifiers, except V, screw in underneath the stem *r*; but this, and all others with covers, screw in above it. W is a silver-speculum, used in this apparatus; and X is a forceps, to take up any object with.

Double reflecting MICROSCOPE, in use at present, is an alteration and improvement by Mr. Culpepper and Mr. Scarlet, of Mr. Marshal's large double microscope; than which it is less cumbersome, may be managed with much more ease, and by means of a reflected light, is capable of shewing objects in a clearer and more pleasing manner. The body of this microscope, A A A A, (plate CLXXIV.) being a large tube, is supported by three brass-pillars *b b b*, rising from a wooden pedestal C; in which pedestal there is a drawer D, to hold the object-glasses, and other parts of the apparatus.

A lesser tube *e e*, slides into the greater, and sends from its bottom another tube much smaller than itself, *f*, with a male screw at the end thereof, whereon to screw the object-glass or magnifier. There are five of these magnifiers numbered 1, 2, 3, 4, 5, which numbers are also marked on the inner tube, to direct whereabouts to place it according to the magnifier made use of: but if then it fits not the eye exactly, slide the inner tube gently higher or lower, or turn the screw of the magnifier gradually till the object appears distinct. O is a round brass-plate with several holes for placing objects in, but two holes are commonly reserved for small concave-glasses, whereon to place a drop of any liquid, in order to view the animalcules, &c. There is also a piece of white ivory, and a piece of black ebony, of the same size and shape as the holes for objects: the ivory is to put opake objects on that are black, and the ebony is to receive such as are white; by which contrariety of colours they will be seen more clearly. Q is a concave looking-glass, which reflects the light of a candle, or the sky, directly upwards on the object to be viewed. V is a plano-convex lens, which serves to transmit the

light of a candle or sun-shine upon any opake object which is placed on the ivory or ebony for examination.

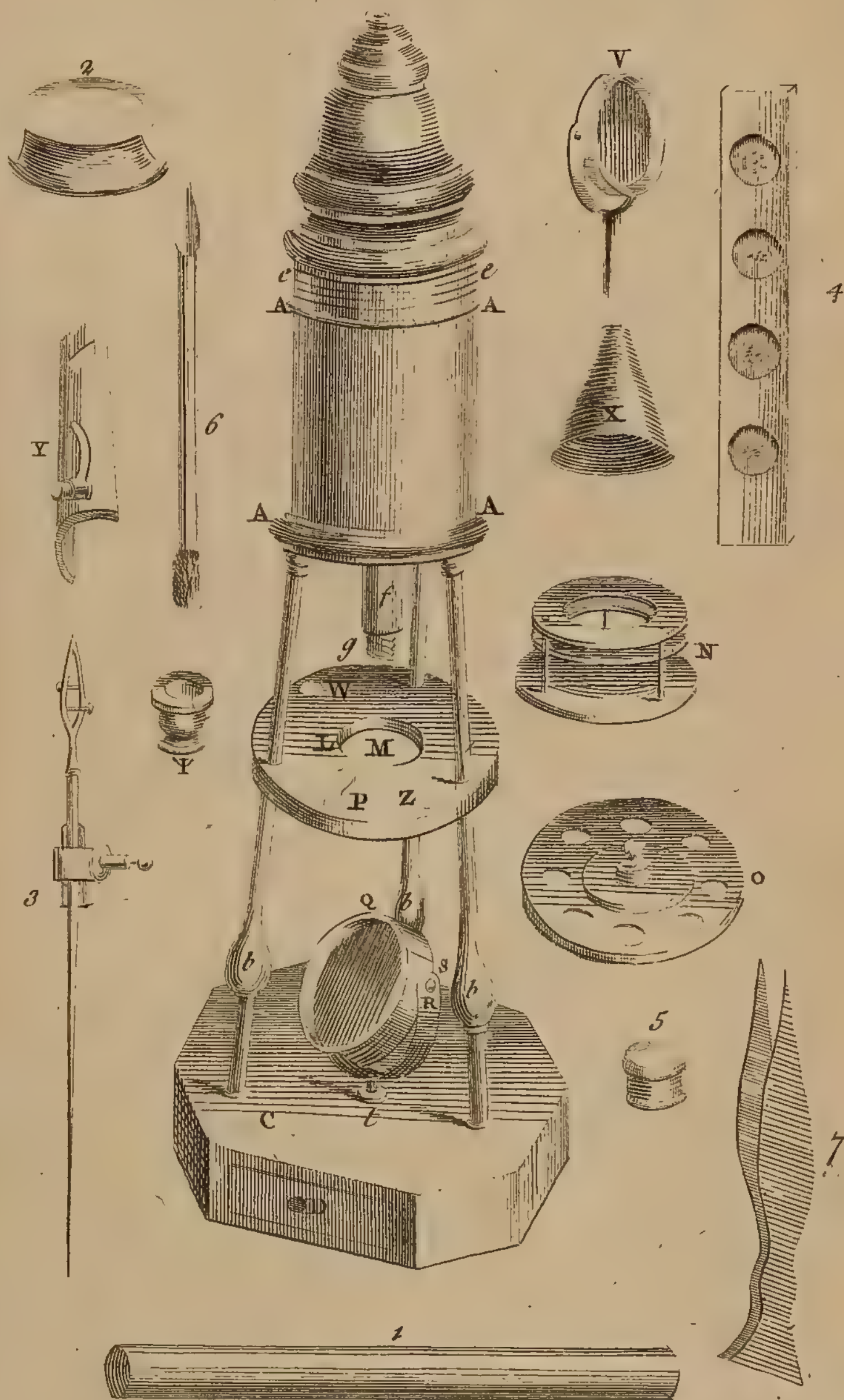
The solar or camera obscura MICROSCOPE, depends on the sun-shine, and must be made use of in a darkened-chamber, as its name implies. This instrument consists of several parts, *viz.* A (plate CLXXV. fig. 2.) a square frame of mahogany to be fixed to the shutter of a window, by means of the screws 1, 1. To this frame is applied a circular collar of the same wood, with a groove on its periphery on the outside, denoted by 2, 3. This collar is connected by a cat-gut to the pulley 4 on the upper part, which is turned round by the pin 9 within. On one part of the collar, on the outside, is fastened, by hinges, a looking-glass G, in a proper frame, to which is fixed the jointed wire 6, 7; by which means, and the screw H 8, it may be made to stand in an angle more or less inclined to the frame. In the middle of the collar is fixed a tube of brass C, near two inches in diameter; the end of which, on the outside, has a convex lens 5 to collect the sun-beams thrown on it by the glass G, and converging them towards a focus in the other part, where D is a tube sliding in and out to adjust the object to a due distance from the focus. To the end G of another tube F, is screwed one of Wilson's single pocket-microscopes, containing the object to be magnified in a slider; and by the tube F, sliding on the small end E of the tube D, it is brought to a due focal distance.

The sun's rays being directed by the looking-glass through the tube upon the object, the image or picture of the object is thrown distinctly and beautifully upon a screen of white paper, or a white linen sheet, placed at some distance to receive the same; and may be magnified to a size beyond the imagination of those who have not seen it. For the farther off the screen is removed, the larger will the object appear, insomuch that a louse may be magnified to the length of five or six feet, or even a great deal more; but it is more distinct when not enlarged to above half that size.

This instrument has been contrived very commodiously in several different forms; but we shall here illustrate the following by a diagram. A R (*ibid.* n^o 2.) is a section of the window-shutter of a dark room,

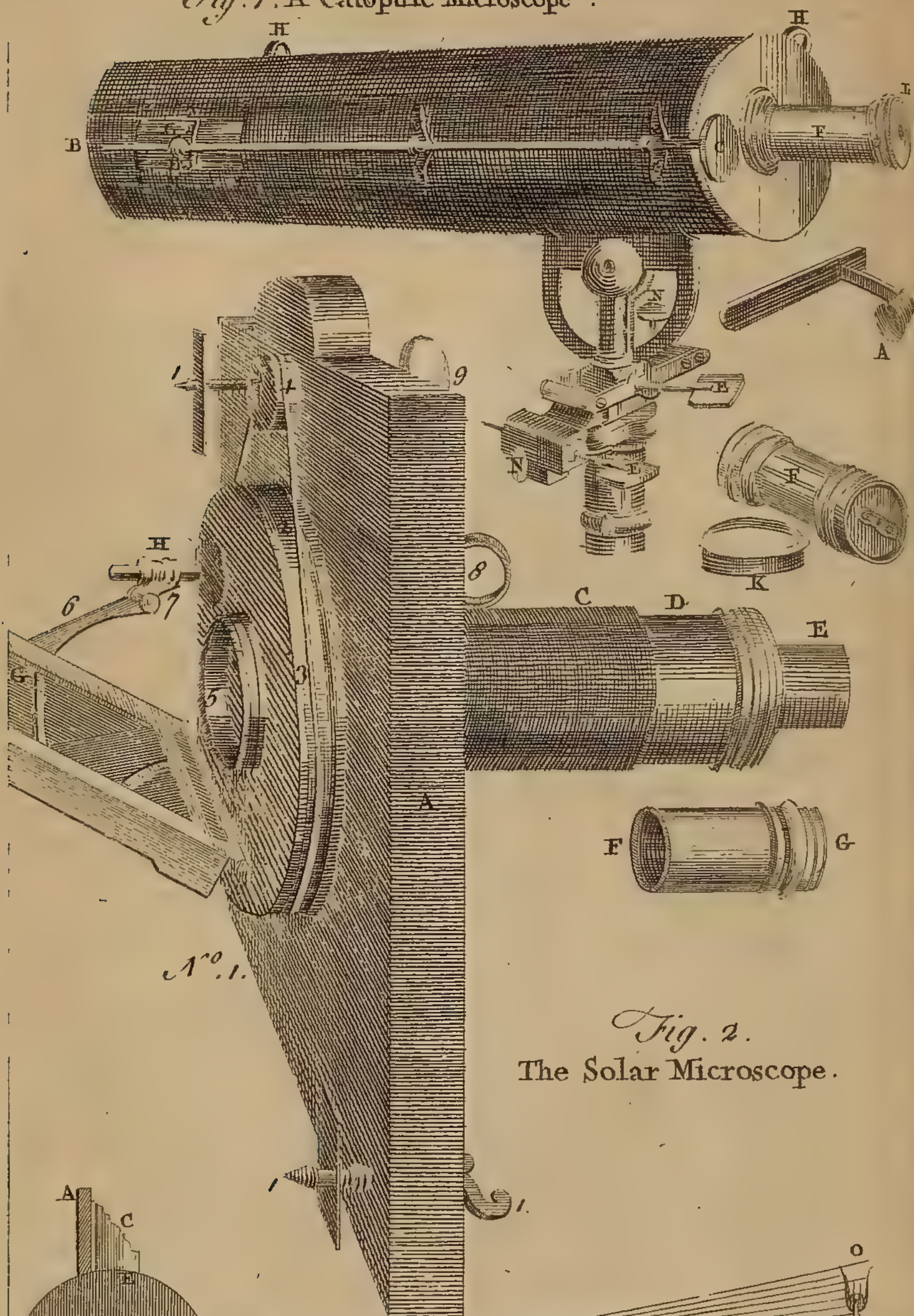
room,

The Double reflecting MICROSCOPE.



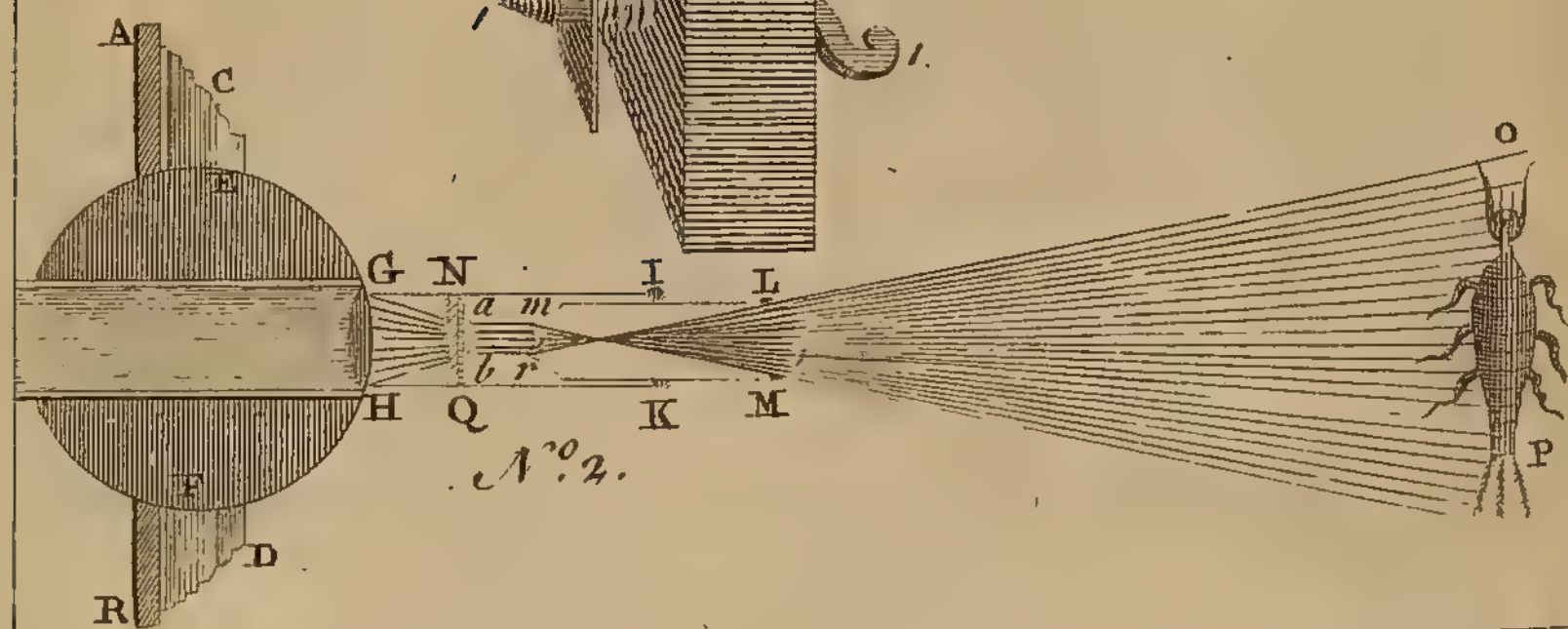
MICROSCOPES .

Fig. 1. A Catoptric Microscope .



No. 1.

Fig. 2.
The Solar Microscope .



No. 2.

room, CD of the frame containing a catoptric ball EF; in the forepart whereof is screwed the tube GIKH, at one end of which is a lens GH, which, by converging the sun-beams into a narrow compass, does strongly enlighten the small object *ab*, placed on a slip of glass, or otherwise, in the part of the tube NQ, where a slit is made on each side for that purpose. Within this tube there slides another, LmrM, which contains a small magnifying lens *mr*. By moving the exterior tube, IGHK, one way and the other, the glass GH will be brought to receive the rays of the sun directly, and will therefore most intensely illuminate the object *ab*. The other tube, LM, being slid backwards and forwards, will adjust the distance of the smaller lens *mr*, so that the image of the object *ab* shall be made very distinct, on the opposite side of the room at OP; and the magnitude of the image will be to that of the object, as its distance from the lens *mr* is to the distance of the object from it, as is evident from the figure.

Thus, for example, suppose the focal distance of the lens *mr* to be one inch = *r*, and let the distance at which it is placed from the object be 1, 1 = *d*; then, if the lens be double and equally convex, as usual, the distance of the image will be

$$\frac{dr}{d-r} = f = 110; \text{ therefore the image will}$$

be 110 times larger than the object in its linear dimensions, and $110 \times 110 = 12100$ times larger in surface; and in solidity it will be $110 \times 110 \times 110 = 1331000$ times larger than the object.

This is the most entertaining of any; and, perhaps, the most capable of making discoveries in objects that are not too opaque, as it shews them much larger than can be done any other way. Such too as have no skill in drawing, may, by this contrivance, easily sketch out the exact figure of any object they have a mind to preserve a picture of.

The MICROSCOPE for opaque objects, remedies the inconvenience of having the dark side of an object next the eye, which has hitherto been an unsurmountable obstruction to the making observations on opaque objects with any considerable degree of exactness or satisfaction; and notwithstanding ways have been tried to point light upon an object from the sun or a candle, by a convex-glass placed on the side thereof; yet the rays from either can be thrown upon it in such an acute angle

only, that they serve to give a confused glare, but are insufficient to afford a clear and perfect view of the object. But in this new microscope, by means of a concave speculum of silver, highly polished, in whose center a magnifying lens is placed, so direct and strong a light is reflected upon the object, that it may be examined with all imaginable ease and pleasure.

Catoptric MICROSCOPE. Though microscopes composed of refracting glasses only have been vastly improved as to their effects of magnifying, yet they have been attended with such great inconveniences, that their application to many arts, in which they might be very convenient, is not so common as might be expected. There is a catoptric microscope described in the Philosophical transactions, n^o 442. which remedies most of the defects of the others, and is made on the model of the newtonian telescope. This microscope magnifies from the distance of nine to twenty-four inches. The manner of using this instrument as a microscope is this: when it is fixed on its stand, the small speculum A (plate CLXXV. fig. 1.) must be thrust home in its slider, in the inside of the mouth of the instrument B, and the screw C turned till the index D cuts one of the numbers at M; then the mouth of the instrument B must be removed from the object the distance in inches expressed by that number, and be directed towards the object, by looking through the hole in the great speculum; the tube that holds the eye-glasses being taken off, and adjusting it by means of two racks E and E, in such manner, that the image of the object may be visible in the middle of the little speculum: then the tube F, holding the eye-glass, must be screwed on, and the small eye-hole in the little brass-plate, which turns on a pivot, applied.

N. B. As the same adjustment of the speculum will not suit all eyes, the screw C must be turned round to the right or left a little, till the object appears distinct. This instrument, besides its use as a microscope, is convertible into a gregorian telescope, by changing the small speculum for one of a different focus.

MIDAS-EAR-SHELL, the smooth ovato-oblong buccinum, with an oblong and very narrow mouth. It consists of six volutions, but the lower one alone makes up almost the whole shell. See BUCCINUM.

MID-HEAVEN, the point of the ecliptic

that culminates, or in which it cuts the meridian.

MIDDLEBURG, the capital city of Zealand, one of the United Provinces, situated in the island of Walcherin, twenty-six miles north-east of Bruges.

MIDDLEBURG, a castle of dutch Flanders, eight miles north-east of Bruges.

MIDDLEHAM, or **MIDHAM**, a market-town in the north riding of Yorkshire.

MIDDLESEX, a county of England, in which London, the metropolis, stands; it is twenty-four miles long, and only fourteen broad, and is bounded by Hertfordshire, on the north; by the river Lea, which divides it from Essex, on the east; by the river Thames, which separates it from Surry, on the south; and by the brook Coln, which divides it from Buckinghamshire, on the west. See the article **LONDON**.

MIDDLEWICH, a market-town of Cheshire, fifteen miles east of Chester.

MIDHURST, a borough-town of Suffex, ten miles north of Chichester; which sends two members to parliament.

MIGRATION, the passage or removal of a thing out of one state into another. See **TRANSMIGRATION** and **PASSAGE**.

MILAN, the capital of the Milanese, or dutchy of Milan, in Italy; east long. $9^{\circ} 30'$, north lat. $45^{\circ} 25'$.

MILAZZO, or **MELAZZO**, a port-town of Sicily, thirty miles north-west of Messina.

MILBORN-PORT, a borough-town of Somersetshire, twenty-five miles south of Bath. It sends two members to parliament.

MILDENHALL, a market-town of Suffolk, ten miles north-west of Bury.

MILDEW, *rubigo*, a disease happening to plants, caused by a dewy moisture, supposed by some to be a species of blight. See the article **BLIGHT**.

MILE, *mille passus*, a measure of length or distance, containing eight furlongs, &c. See the article **MEASURE**.

The english statute-mile is fourscore chains, or 1760 yards; that is, 5280 feet. See **CHAIN**, **YARD**, and **FOOT**.

We shall here give a table of the miles in use among the principal nations of Europe, in geometrical paces, 60,000 of which make a degree of the equator.

Geometrical paces.

| | |
|-------------------------|------|
| Mile of Russia | 750 |
| of Italy | 1000 |
| of England | 1250 |
| of Scotland and Ireland | 1500 |

Geometrical paces.

| | |
|--------------------------------|------|
| Old league of France | 1500 |
| The small league, <i>ibid.</i> | 2000 |
| The mean league, <i>ibid.</i> | 2500 |
| The great league of France | 3000 |
| Mile of Poland | 3000 |
| of Spain | 3248 |
| of Germany | 4000 |
| of Sweden | 5000 |
| of Denmark | 5000 |
| of Hungary | 6000 |

MILFORD-HAVEN, the most commodious harbour in Great-Britain, situated in the south-west part of Pembrokeshire in Wales, at the north entrance of the Bristol-channel.

MILIARY, in general, something resembling millet-seeds.

Anatomists give the name miliary-glands to numerous spherical bodies, each with an excretory duct, found in the nose, the eye-lids, the ears, the nipples, under the arm-pits, and in the cutis of the penis and scrotum, the pudenda of women, and about the anus: but they are found to vary extremely, both as to size and number, in different persons; and Heister, Boerhaave, Ruysch, and others, declare, that these globose bodies are not true glands, but only certain secretory ducts from the arteries of the skin; which either from the density of the cuticle in those parts, or from the thickness of the matter contained in them, becoming obstructed, are thereby formed into these tubercles.

MILIARY-FEVER, a malignant fever, so called from the eruption of certain pustules resembling millet-seeds.

It begins with a slight shivering, succeeded by heat and loss of strength, sometimes even to faintness; there is a straitness and anxiety about the breast, attended with deep sighs, restlessness, and disturbed sleep; and to these succeed a roughness of the skin like that of a goose, and a great number of pustules appear, sometimes white and sometimes red, or both together, of the size of a millet or mustard-seed. They first beset the neck, then the breast and back, and afterwards the arms and hands: and when these appear, the other symptoms gradually go off; the pustules ripening, and containing a stinking ichor. These pustules appear on the third, fourth, seventh, or sometimes not till the fourteenth day.

The principal intention of cure, is to expel and keep out the morbid matter which forms the pustules; for it is often fatal.

fatal when the pustules disappear, and cannot be driven out again. Bleeding should be cautiously used; and the patient should not rise out of bed, or continue long in an erect posture, for fear of fainting, or striking the pustules in: analeptic medicines are necessary to keep up the spirits; and to these may be added, according to circumstances, gentle diaphoretics. Some greatly commend diaphoretic antimony, for promoting the discharge of the pustules, and to take off a delirium; the dose being a scruple every sixth hour. Hoffman recommends blisters, applied to the legs, for the same purpose.

Hamilton's method of cure is to give the testaceous powders, which keep up a moderate warmth, absorb the acidity of the blood, and promote a breathing sweat: take of powder of crab's claws and sperma-ceti, each one scruple; of saffron, five grains; and of the pectoral syrup as much as is sufficient to make into a bolus, to be taken every sixth hour. Blisters are also necessary through the whole course.

MILITANT, or **CHURCH-MILITANT**, denotes the body of christians while here on earth. See the article **CHURCH**.

MILITARY, something belonging to the soldiery or militia.

MILITARY ARCHITECTURE, the same with fortification. See **FORTIFICATION**.

MILITARY ART, the science or art of making or sustaining war to advantage.

MILITARY WAYS, *viæ militares*, the large roman roads which Agrippa procured to be made through the empire in Augustus's time, for the marching of troops and conveying of carriages. These were paved from the gates of Rome, to the utmost limits of the empire. See **ROAD**.

MILITIA, in general, denotes the body of soldiers, or those who make profession of arms.

In a more restrained sense, militia denotes the trained bands of a town or country, who arm themselves, upon a short warning, for their own defence. So that, in this sense, militia is opposed to regular or stated troops.

For the direction and command of the militia, the king constitutes lords-lieutenants of each county.

MILMIUM, **MILLET**. See **MILLET**.

MILK, *lac*, a well known animal fluid, which nature prepares in the breasts of women, and the udders of other ani-

mals, for the nourishment of their young. Milk, according to Boerhaave, is a liquor prepared from the aliment chewed in the mouth, digested in the stomach, perfected by the force and juices of the intestines, and elaborated by means of the mesentery and its gland and juices, and the juices of the thoracic duct. It has undergone some actions of the veins, arteries, heart, lungs, and juices, and began to be assimilated; yet may still be had separate and discharged out of the body. And thus by their own milk, prepared from the proper matter of the chyle, all the known lactiferous animals are nourished, both male and female. For milk is always prepared from chyle as well in men as in women, in virgins and barren women, in mothers and nurses. Whence every such animal consists, is nourished, and lives on its own proper milk; and from this alone prepares all the other parts, both the solid and fluid, by means of the vital actions. It is also certain that many live for years by feeding on milk alone, and perform all the actions of life, and have all the solid and fluid parts of their bodies perfectly elaborated: the serum, therefore, the blood, the lymph, the spirits, bones, cartilages, membranes, and vessels, proceed from milk; and milk must contain in itself the matter of all the parts of the human body. Milk approaches nearer to an animal nature than chyle. See **CHYLE** and **CHYLIFICATION**.

If milk be good, and suffered to rest in a clean vessel, it first appears uniformly white; then throws up a white, thick, unctuous cream to its surface, and remains somewhat bluish below. The milks of all the known animals have these properties alike. The human milk is very sweet and thin, the next is that of asses, then that of mares, then of goats, and lastly of cows: whence it is prescribed in this order to consumptive persons of weak viscera. The rennet prepared of the juices of such creatures as chew the cud being mixed with milk, coagulates it into an uniform mass, which may be cut with a knife, and it thus spontaneously separates into whey and curds; if long boiled over the fire, it loses its more fluid parts, and condenses into a butyraceous and cheesy mass.

It may be shewn from reason, without the evidence of experience, that milk is an efficacious remedy in disorders of the breast.

breast. But it is to be observed, that all milks are not of the same kind, and of the same efficacy for all purposes: since, according to the diversity of animals and their respective foods, they are possessed of different and peculiar qualities which are to be considered apart. First, then, asses-milk, which was always greatly esteemed by the ancients, contains a great deal of sweet serum, but a very small quantity of earthy, caseous, and pinguious substance, for which reason it is not easily coagulated, and, consequently, but very unfit for butter and cheese. Its whey is astringent, laxative, moistening, and proper for correcting the acrimony of the humours. Goats-milk does not contain so large a quantity of whey as that of asses, nor is it of so laxative and astringent a nature, but of a thicker consistence. And, as goats eat the leaves of trees which contain something of a resinous quality, their milk is very efficacious for the consolidation of suppurated parts. Cows-milk is more pinguious, contains a large quantity of earth, but less whey, for which reason it generally yields a great deal of butter and cheese. This species of milk is of a temperating, nutritive, and consolidating virtue. Women's milk, for medicinal purposes, is preferable to all others; for it is the sweetest of them all, and its nutritive quality is sufficiently observable in infants. The virtues of milk are also different, according to the diversity of herbs and pasturage, which animals eat. Hence milk in the spring is highly salutary, because at that time the vegetables abound with temperate juices; whereas milk in the winter is accounted less salutary, because the animals feed on hay and straw. According to Quincy, milk is very proper to alter a sharp thin blood into a crasis more soft, balsamic, and nutritive; and in the constitutions, where it agrees in the first passages, it cannot but be proper for such an end, as being already prepared into nourishment as far as is required for its admission into the blood.

Where milk of what kind soever is ordered in consumptions, and as a restorative, it is with very good reason joined with the testacea, and such things as are proper to destroy acidities. As for the difference of milks from the different creatures which produce them, there seems as much owing to their different food and manner of living, as to any specific difference in the creatures themselves.

That which is most common in our food, cow's milk, seems to be of the most substance and most nutritive of all. In the use of these there is a great deal in being more or less accustomed to any particular sort; for at first, with many, it is frequently purgative, but this does not continue. In short, experience is the best guide in these courses, and physicians of the best skill and penetration sometimes are disappointed in their expectation from their use. There are some other intentions for which milk courses are directed besides that of a restorative; for they are gone into frequently as correctors and sweetners, but they are not to be trusted to in such cases, although they certainly are good helps together with more effectual means.

Dr. Cheyne recommends a milk and seed-diet with water for drink, as the surest preservative against diseases, and cure of them. See GOUT, PALSY, &c.

Disorders from MILK. The milk is often very troublesome and dangerous to women in their lying-in, and subjects them to many painful disorders. The milk fever happens on the third or fourth day from delivery, and arises from a conjection of milk in the breasts, which frequently extend to the arm-pits, where the pain is sometimes violent. This fever generally continues a day or two, and ends spontaneously, by the benefit of nature, in copious sweats, which are proportionable to the cold fits or preceding rigours. There may sometimes be occasion for hot diluents and gentle diaphoretics: the patient should use a slender diet, and put the child often to the breast; but if she does not design to give suck, a slender diet, testaceous powders, and diaphoretics will be more necessary; and the breast should be drawn by some proper person. If the flux of the lochia be too sparing, it should be promoted. If the pain is great, the lochia commonly stop; but flow again when it ceases. To prevent the inspissation of the milk, the breasts may be embrocated with warm linseed-oil, or oil of sweet almonds, or the leaves of red cabbage may be laid thereto. If the fever is very acute and hot, and an inflammation of the breasts is feared, it will be proper to bleed. Women commonly put double cloths dipt in brandy under the arm-pits, to drive back the milk. See the article INFLAMMATORY FEVERS.

A too great thinness of the milk is a common

common complaint with nurses: this is to be laid sometimes to the diet, sometimes to the concoction, and sometimes to the unnatural tenuity of the humours. In this case the milk is sometimes perfectly watry, and the child is thrown into an atrophy by it. The remedies for this are a change of diet, and a purging of the primæ viæ, by some gentle cathartic, and afterwards a strengthening of them, by bitters and stomachic medicines: sometimes it is also necessary to evacuate the serous humours, by the common phlegmagogues, such as jalap in proper doses, with a little powdered ginger, which is an excellent corrective for it.

The milk is sometimes salt to the taste, and sometimes of a bilious yellow colour, and these distemperatures of it usually throw the child into colics, diarrhoeas, vomitings, cutaneous eruptions with scabs, sometimes absolute ulcerations, and sometimes into fevers. In this case the nurse is to take the absorbents and nitrous medicines with intermediate purges; but during the course of taking these remedies, and for some time afterwards, the diet must be under some regulations, particularly salt foods are to be avoided, and all acids, aromatics, and strong liquors either wholly let alone, or taken very sparingly: the person must carefully avoid all violent passions of the mind, as anger, fear, and the like, and abstain from all violent emotions of the body.

A contrary extreme to the thinness and watry appearance of the milk is a mucous thickness of it: this is principally troublesome and dangerous to the parent, as it is apt to bring on tumours and nodes of the breast. The method of treatment in this case is to give gentle alexipharmics for some days: then the gentle laxative medicines in small doses, and finally allow a moderate use of wine.

Deficiency of milk is also a very common complaint, and it is in some cases absolute; there being no milk at all derived into the breasts: in others, it is only a partial one; there being some milk, though not enough to supply the child with nourishment. A total deficiency of milk most frequently happens to those who have their first child when somewhat advanced in years, and to such as are of a choleric disposition; but a partial deficiency of it is often owing to a saltiness of the serum, and sometimes to the want

of nourishments, and often is brought on by sorrow. When saline and bilious humours are in fault, then lac-lunæ, calcined crystal, and other absorbent powders become of great use: some also prescribe the powders of earth-worms carefully dried, and the voiding the humours by stool, by means of gentle purges: when the want of nourishment is the only occasion of it, the milk may always be recovered in a proper quantity, by means of good foods with milk and other nourishing fluids.

An over-abundance of milk is as common a complaint as a deficiency of it, and requires as much care in the treatment of it, otherwise the person is frequently subject to nodes and abscesses in the breast: the proper remedies are the eating and drinking more sparingly, and letting two children suck instead of one, together with those methods already prescribed in the milk-fever.

MILK of Sulphur. See SULPHUR.

MILL, a machine or engine for grinding corn, &c. of which there are several kinds, according to the various methods of applying the moving power; as water-mills, wind-mills, mills worked by horses, &c.

In water-mills the momentum of the water is the moving power, and the attrition of the two stones in grinding, is the force to be overcome. Of these there are two kinds, *viz.* those where the force of the water is applied above the wheel, and those where it is applied below the wheel; the former being called over-shot, and the latter under-shot mills: and to these we may add a breast-mill, where the water strikes against the middle of the wheel.

Some may imagine, that it is hardly worth while to write about so common a thing as a corn-mill; but the commonness of it shews its usefulness, and therefore it would be unpardonable in us to pass it over in silence.

Few people are ignorant, that corn is ground by two mill-stones, placed one above the other, without touching. The lower or nether mill-stone is immovable, but the upper one turns upon a spindle. The opposite surfaces of the two stones, which act to grind the corn, are not plane or flat; but the upper one is hollow, and the under one swells up; each of them being of a conic figure, whose axis indeed is very short in proportion

portion to the diameter of its base: for the upper one, being six feet in diameter, is hollowed but about one inch at its center; and the lower one rises but about $\frac{3}{4}$ of an inch. These two mill-stones come nearer and nearer towards their circumference, whereby the corn that falls from the hopper has room to insinuate between them as far as $\frac{2}{3}$ of the radius, which is the place where it begins to be ground, and where it makes the greatest resistance that it is capable of; the space between the stones being in that place about but $\frac{2}{3}$ or $\frac{3}{4}$ of the thickness of a grain of corn. But as the millers have the liberty of raising or sinking the upper stone a little, they can proportion its distance from the lower one, according as they would have the flour finer or coarser.

The circular motion of the upper mill-stone brings the corn out of the hopper by jerks, and causes it to recede from the center towards the circumference, where being quite reduced to flour, it is thrown out of the mill, by the centrifugal force of the stone, through a hole provided on purpose.

As the water acts upon an over-shot mill both by impulse and weight, so does it likewise upon a breast-mill, or that where the water comes upon the breast or middle-part of the wheel: and here, though the weight of the water is not so great as in the overshot mill, being contained in the buckets of the lower quarter only; yet the impulse of the water is much greater, the height of the water being increased nearly the semi-diameter of the great wheel, all other things being equal. If the height of the water remain the same, the aperture of the penstock must be enlarged to nearly twice the area, that the force may be the same; so that to produce the same effect, twice as much water is necessary for a breast-mill as for an over-shot one, every thing else being the same.

As to the undershot-mill, it is evident there can be only the impulse from the water; and therefore, the height of the water remaining the same, there must be a larger aperture of the penstock for the discharge of a greater quantity of water in the same time, in order to produce the same effect as in the overshot or breast-mill: whence a greater expence of water will be made here than in any other mill, and can only be supplied for a constancy by a river; and where this can be

had, the undershot is the easiest, cheapest, and most simple structure a mill is capable of.

The diameter of common mill-stones, according to Dr. Desaguliers, is from five to seven feet, and their thickness, twelve, fifteen, or eighteen inches: they last thirty-five or forty years; and when they have been long used, so that their thickness is considerably diminished, they are cut anew.

Here follows the description of an undershot-mill, taken from Belidor's architecture hydraulique. A B (plate CLXXVI. n° 1.) is the undershot-wheel, upon whose shaft D is fixed a spur or cog-wheel E, whose cogs take the rounds of the trundle or lantern G, which carries round the mill-stone in the hurst or round frame I, containing the lower mill-stone at NN, and the upper one at VV; the axis, or spindle, fixed to the upper mill-stone being the iron-bar F H. They commonly make these sort of undershot-wheels from twelve to eighteen feet in diameter, the float-boards about two and a half or three feet long, and ten or twelve inches deep. The shaft is fifteen or eighteen inches in diameter; the cog-wheel, eight feet in diameter: it has forty-eight cogs four inches high, and three inches and a half wide. The lantern or trundle is made of two round pieces, or flat-heads, twenty-two inches in diameter, and four inches thick, in which are set nine rounds of two inches and a half diameter, and eighteen inches high. Through the trundle goes an iron axis, two inches and a half square, and of a height proportionable to the situation of the mill-stones: it must be well fastened to the upper mill-stone, and its lower end being reduced to a pivot, turns in a socket let into the supporting piece H. The section of a mill-hopper and drum that covers the mill-stones, is represented *ibid.* n° 2. The hopper is a small trough A, with a spout B, to convey the corn out of the hopper into the aperture of the upper mill-stone, DD. The iron-bar which passes through the trundle, is marked C, and the under mill-stone EE, the interval or space between the stones being represented by the dark crooked line FF.

To this account of an undershot-mill, we shall add that of an over-shot one; wherein A B (*ibid.* n° 3.) is the axle-tree or shaft of the water-wheel, which has six arms C, C, &c. fixed in it at D. The

sole of the wheel, marked E E E, is fixed, and contains thirty buckets, about eighteen inches broad, and fourteen inches deep; the elbow to the sole, G H, being four inches. L, a cog-wheel placed on the same shaft by four arms at M, has forty-eight cogs, which turn the wallower, pinion, or trundle N, with nine rounds or leaves; and in this trundle is fixed an iron-spindle N Q, going through the middle of the lower mill-stone P, and turning the upper one R, by means of the rind Q.

I is another wallower or trundle, which is applied at pleasure to the cog-wheel L; and on the same axis is another cog-wheel K, having forty cogs, which turn S a wallower of nine rounds; whose axis T has a rind V at its top, whereby it bears and turns the upper mill-stone W. Y Z is a trough or lander, which conveys the water from the pool or dam to the buckets of the wheel at Z. This has a penstock *ab*, and an orifice *cd*, with a shuttle or sluice to open or shut it; and is generally raised about two inches above the wheel, by means of a lever *e*, fixed to the shank by the handle *f*. The surface of the water in the pool must be considerably higher than the level of the top of the wheel.

Dr. Barker's new invented mill (*ibid.* n° 4.) is of the most simple structure of any yet made, performing its effect without any wheel, trundle, cog, or round; the manner of whose operation may be easily understood from the following account of its several parts. A B C D is an upright frame, standing on a proper base; E F is the wider part of G H, an upright hollow pipe or tube, fixed at the bottom to an horizontal square trunk I K; which trunk, together with the tube, is fixed to an upright spindle or axis R S, by means of a nut and screw at S. The lower end of the axis moves on a fine point in the pivot-hole, in the part of the frame at T. On the upper part of the frame is a hole through which the spindle passes, as also through the round circular piece P, fixed on the said frame. On the upper part of the spindle is fixed another round piece O, which represents the upper mill-stone. Q is a spout of water filling the tube or trunk, and giving motion thereto; and consequently to the axis and upper stone: by the horizontal jets of water from each end to the trunk I K, through holes made at each end on contrary sides.

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While the holes continue stopped, the trunk will be at rest, because then the pressure is equal over all the parts; but when the holes are open, the pressure of the water (by its having liberty to issue out) will be less on that part where the hole is, than on the other part opposite to it; which stronger pressure will prevail, and carry round the trunk and tube with the axle and stone, in a contrary direction; and each hole contributes to produce this motion, which will be greater or lesser in proportion to the momenta of the jets of water, or greater or lesser aperture of the holes.

For it is easy to understand, that the power of this machine is derived from, or depends upon, three things: 1. The velocity of the spouting-water. 2. The quantity thereof. And, 3. The distance at which the water spouts from the axis of motion. The two first make the momentum arising from the pressure of the fluid, which is proportional to the altitude or height of the tube; the last is of a mechanical nature, for the trunk is, in this respect, exactly of the nature of the lever.

When the quantity of water is not sufficient to turn an undershot-wheel, and there is not height enough for an overshot-one, the water is made to fall into the buckets of a breast-wheel, as it is called, (see plate CLXXVII. fig. 1.) about the height of the center of the shaft, and to work by its weight till it gets to the bottom, thro' the channel T G D.

The late ingenious Dr. Barker contrived one of these, which, notwithstanding the disadvantage already hinted, fell little short of an overshot-one. The wheel A A A is nineteen feet in diameter, with twelve arms and twenty-four ladle-boards, which receive the water a little above the horizontal diameter of the wheel, at T, and do not part with it till they come to the lowest part of the wheel. To effect this, there is a circular channel G G H, the section of which *g g G G*, (*ibid.* fig. 2.) made by a plane passing through the wheel's center, is every where eighteen inches square: the ladle-boards, F F, (*ibid.*) nearly fill this channel, so as to just pass down without touching it. D d is the supporter of the ladle-board, with a hole near *d* to drive a key or wedge on the inside of the sole of the wheel, *aaaa*, to hold fast this piece together with the ladle-board.

Of all the water-mills that have hitherto
12 N been

been thought of, there are none more ingenious or simple than those which have been invented at Toulouse in Languedoc; the description of which, taken from Belidor, is as follows.

There are sixteen mills a-breast which go continually, and which serve both the city and county around it with flour: but as they are all equally acted upon by the current, and are independent of one another, we shall only describe three of them.

Plate CLXXVIII. fig. 1. shews the plan of several pieces of mason work that serve as piers to several arches which shut with sluices, and are represented in fig. 4. which is an elevation took upon the length A B. Every sluice answers to a channel 7, faced with mason-work, and which grows narrower continually till it comes to C D, where it terminates at a cylindrical vessel C E D without any bottom, which is likewise of stone-work: the water which is confined behind the sluice 5, and passing through the hole 22, enters with great velocity into the channel, and not finding so large a passage to run out by as that by which it entered, it swells and falls with the greater force into the cylinder, forming a whirlpool, and turns a horizontal wheel at the bottom of it, which is represented at F. The axle I of this wheel terminates at the mill-stone K, fig. 2. The water, when it has run round several times in the cylinder, and struck the ladles of the wheel, runs out again by the openings left betwixt these ladles at the bottom of the cylinder, and goes off on the underside by a slope. This may serve to give a general idea of the construction of these mills, which we shall now describe more particularly.

The wheel has a pivot which is fixed in the socket made in the resting place N, (fig. 2.). This resting place is supported at V by a threshold into which it is morticed; the extremity of it, X, is fixed by an iron-pin to the beam O, suspended by the lever P Q, (fig. 2.) supported at one end P, and suspended at the other to the beam Q R, pierced at the top with several holes to receive an iron-pin: and as all the different pieces move together, when the extremity R is lifted up or let down, the wheel F may be raised or lowered on purpose to bring the upper mill-stone K near to the under one, as is usual in common mills.

The height of the cylinder is expressed

by L M, and you may see, on the side where the water runs off, the mason-work of which it is composed, and which is supported by these beams M and T. There is in this part an arch S behind each cylinder, which cannot be well distinguished but in fig. 3. which is an elevation of the mill upon the line Q R, where you may distinguish the different parts on the inside from the place where the water enters to where it runs out. And to know them you have only to seek for the different figures and letters of the several plates, which show the relation of the parts to one another, in the different points of view. The masonry of the cylinders is founded upon carpenter's work: for as the water passes underneath, it was necessary to build them in the air, and to support them on the piers Y, y.

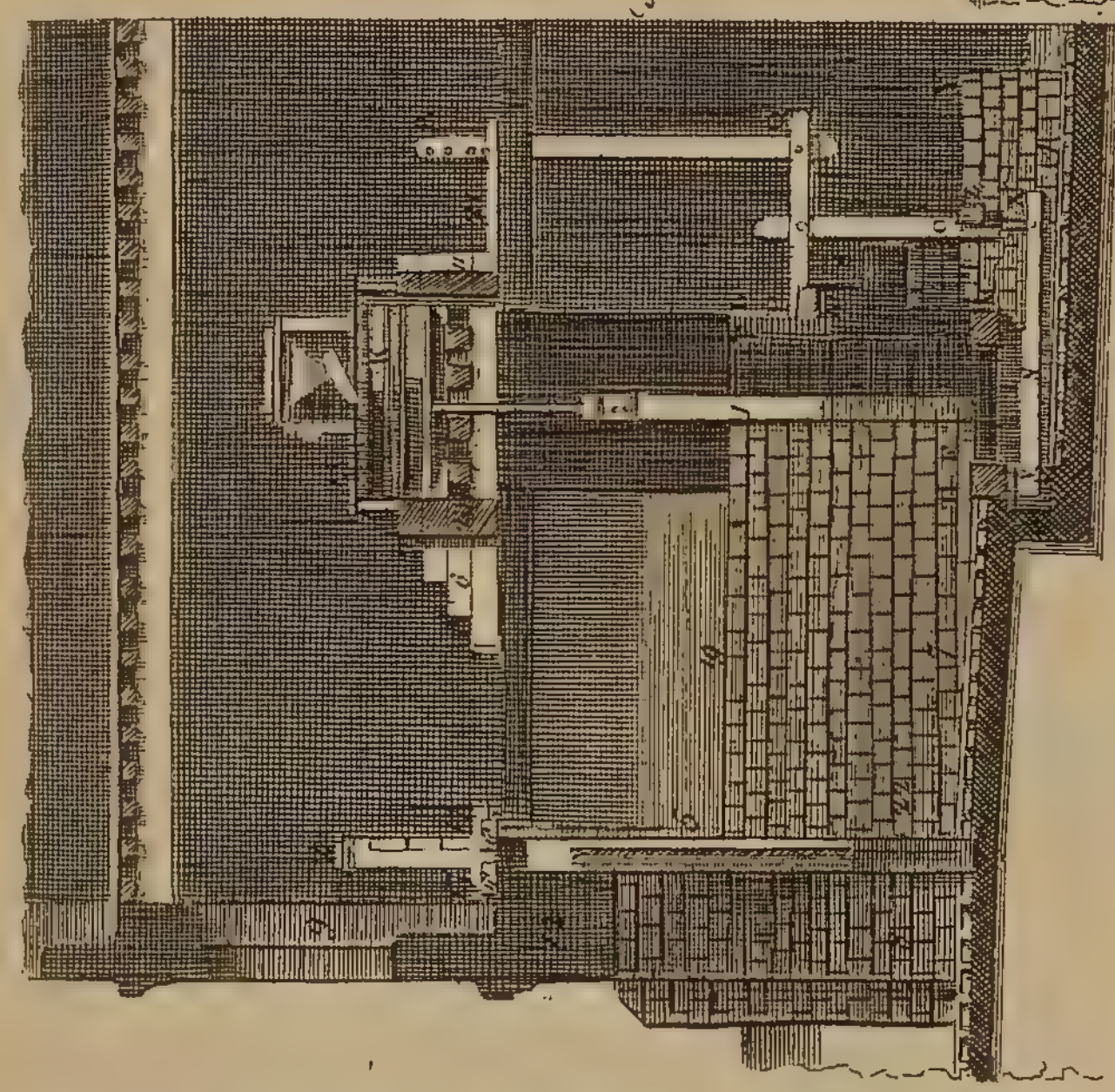
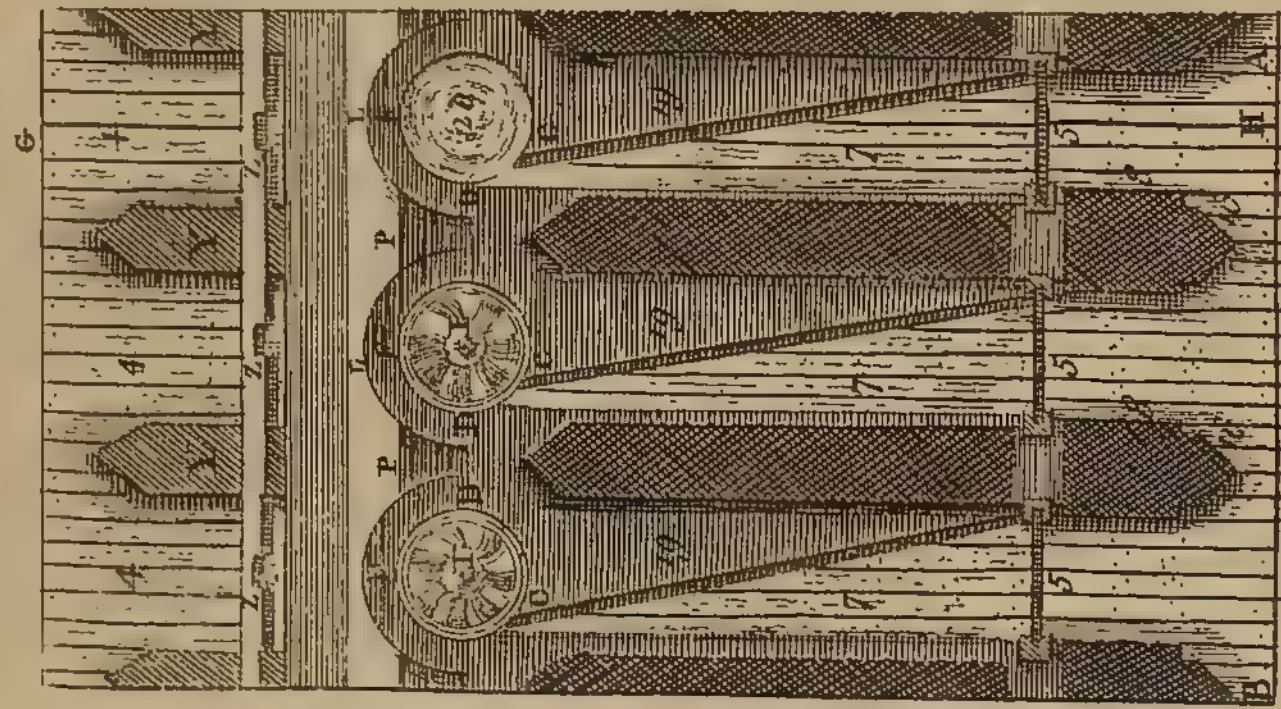
These mills are so disposed, that all the parts belonging to one, may be taken to pieces without hindering the going of any of the rest, when there is any repairs to be made, as every one has its own channel, which needs only to shut to be at liberty of working both above and below.

As there is only five feet four inches (almost six feet English) from the center of one mill-stone to another, you may build twelve mills upon a river of ten or twelve fathoms in breadth, whereas usually they only make four, and moreover they are obliged to build on both sides: in this kind, as there is neither cog-wheel nor trundle-head, nor any friction besides that of the pivot of the wheel, they seldom want repairs. The wheel is three feet in diameter and is made of one piece of the body of a tree, and the ladles are cut out on it, which are inclined on its thickness, and made somewhat bending, as you may see on the figure.

There might be several curious enquiries made for the improving this wheel; we shall only mention, that the water which turns it moves it with a force compounded of its weight and the circular direction which it receives from the cylinder: the bending of the ladles ought to be circular, and the inclination which they have from top to bottom, ought to make an angle of $54^{\circ} 44'$ with the axle of the wheel, since it is the same case as the sails of a wind-mill.

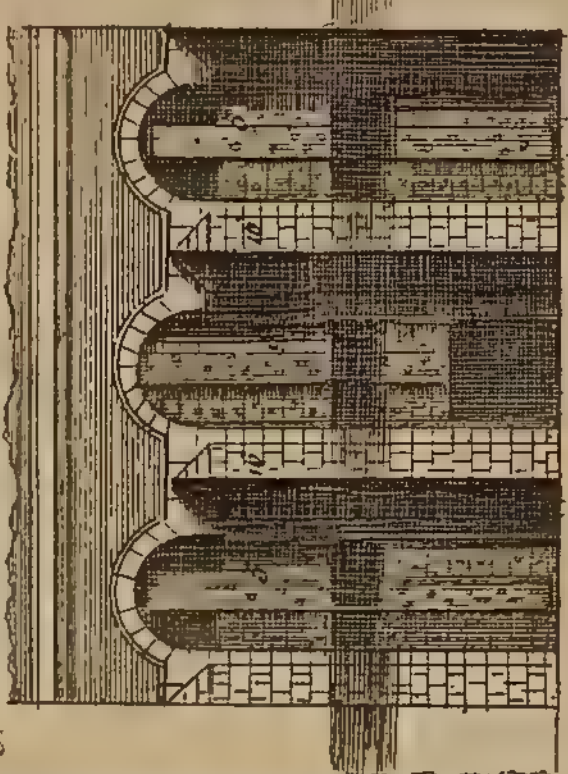
Hand MILL, or horse MILL, that worked by the hand, or by horses, &c. A (plate CLXXVII. fig. 3.) the long beam or lever

MILLS with Horizontal Water-Wheels
Fig. 1. A Plan of their Mason-Work, &c.
Fig. 2. A Section taken on the Line G.H.
Fig. 3. A Profile and Elevation
taken on the Line Q.R.



A Scale of 12 Paris Feet

Fig. 4. An Elevation taken on the Line A.B.



J. Jefferys sculp

Fig. 1. An Elevation of A Powder-MILL.

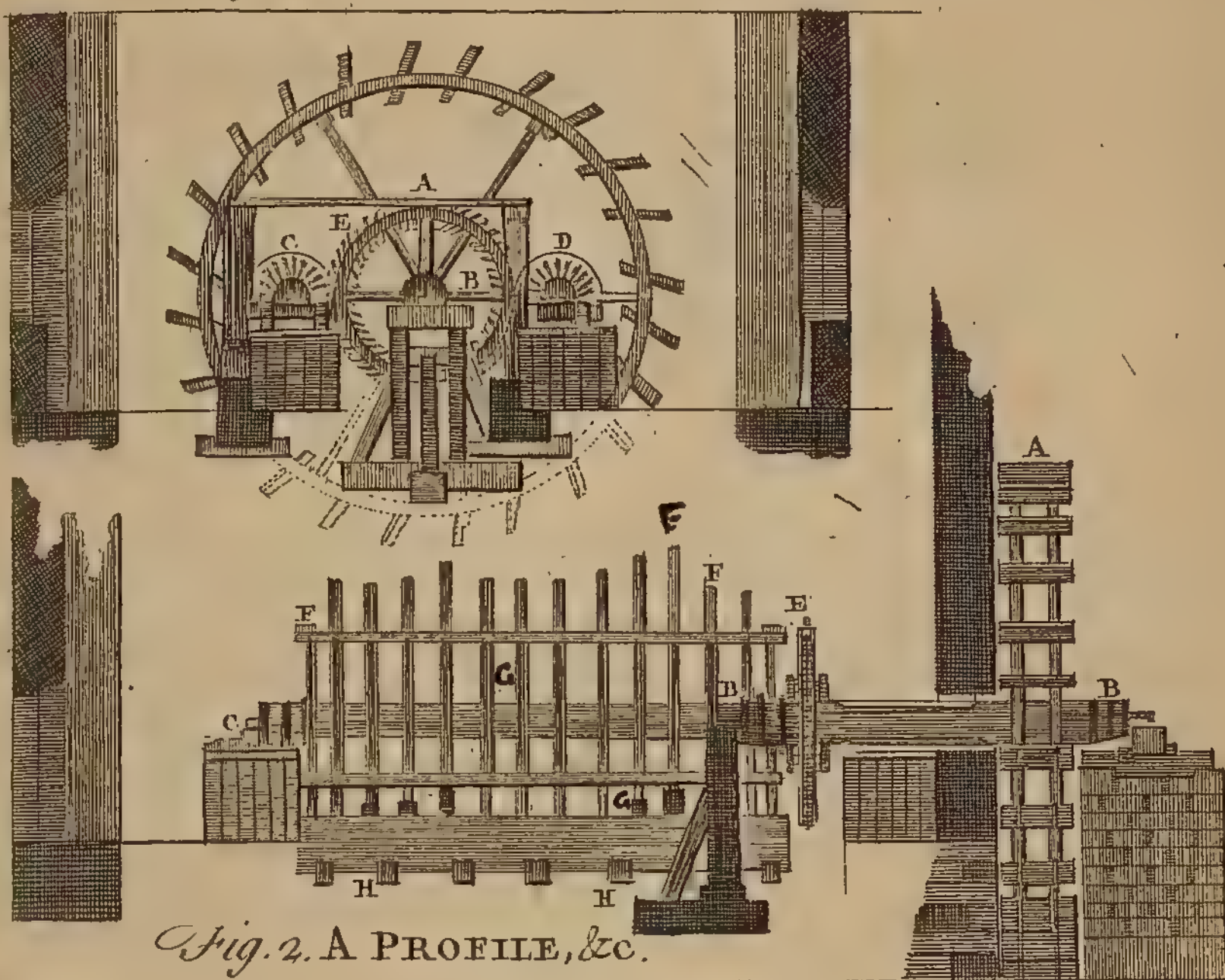
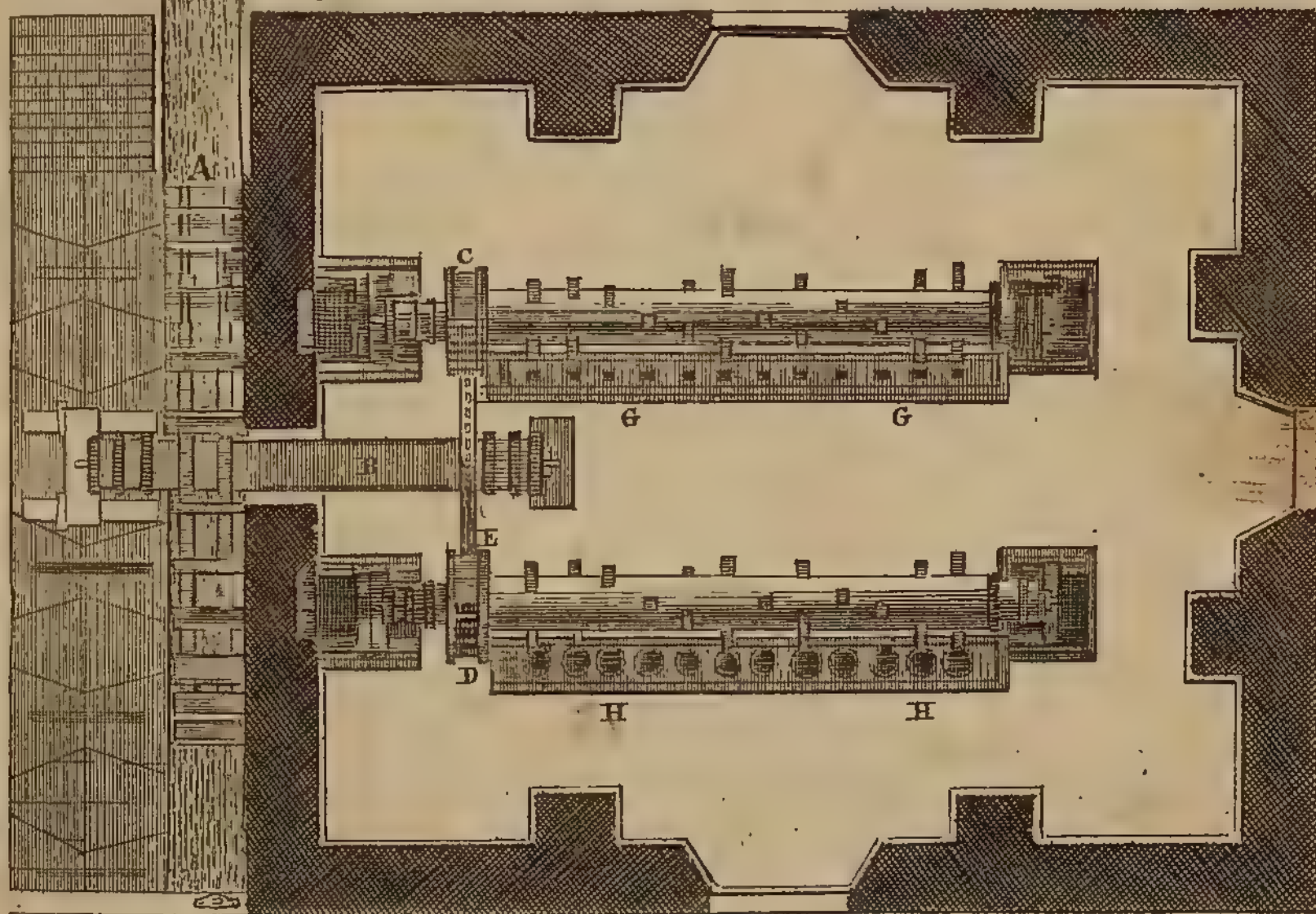


Fig. 2. A PROFILE, &c.

Fig. 3. Plan of A Powder-MILL.



lever for moving it, may be double, triple, or quadruple, so as to receive several men or horses, to drive several mills at once. B is the cog wheel, placed horizontally, with pins fixed, not on its plane, but on the outside, at the circumference of the joints. The trundle-head is marked C, the support D, the iron-axis E, and the drum where the mill-stones are inclosed F.

MILL is also used for any machine, which being moved by some external force, makes a strong impression on things applied thereto: such are fulling-mills, paper-mills, mills used in coining, gun-powder-mills, oil-mills, stamping-mills, sugar-mills, &c. See **FULLING**, **PAPER**, **COINING**, &c.

Cyder-MILL. The cyder-mill (*ibid.* fig. 2.) consists of a large round trough, A; into which the apples are thrown, and there reduced to a pulp, by means of the wooden wheel, B, whose axis, D, is fastened to a turning beam, C, and turned round by a horse. When the apples are thus reduced to pulp, they are put into the cyder-press. See the article **PRESS**.

Gun-powder MILL, is that used for pounding and beating together the ingredients whereof gun-powder is composed. See the article **GUN-POWDER**.

These ingredients being duly proportioned and put into the mortars of the mill, which are hollow pieces of wood, each capable of holding twenty pounds of paste, are incorporated by means of the pestles and sprinkling. There are twenty-four mortars in each mill, where are made each day 480 pounds of gun-powder; care being taken to sprinkle the ingredients in the mortars with water, from time to time, lest they should take fire. The pestle is a piece of wood ten feet high and $4\frac{1}{2}$ inches broad, armed at bottom with a round piece of metal. It weighs about sixty pounds.

But the operation of this mill will be better conceived from an inspection of its several parts. Plate **CLXXIX**. fig. 1. represents the plan of the water wheel and trundle-heads; where A is the wheel, B its arbor; C, D, the two trundle-heads, each turning with their proper arbor; E the cog-wheel driven by the arbors of the great wheel, and inserting its teeth between the spindles of the trundle-heads, makes one of them turn one way and the other another way.

Fig. 2. *ibid.* is the profile of the great wheel and cog-wheel, marked A and E;

where B B is the arbor of the great wheel, C the arbor of the trundle-head C, F F the pestles, and H H the outsides of the mortars,

Fig. 3. *ibid.* is a plan of the whole machine; A being the great wheel; B its arbor; C, D, the trundle-heads, each with its proper arbor, called here canting-wheel; being each environed with twelve small pieces of wood, called lifts, jutting out to raise the pestles. E is the cog-wheel; G G the tails of the pestles, and H H the bottoms of the mortars.

If water be given to the great wheel, the cog-wheel must likewise move and drive contrary ways the two trundle-heads and their canting-wheels; and each lift, turning with the canting-wheels, meets with the stay of a pestle, and lets it fall into its mortar. These twelve lifts are disposed in such a manner, that there is always four of them up, and four pestles unequally ready to fall, so that only one of them falls at a time; and on this disposition of the pestles depends the equality of the trituration, which succeeds still better, by making the paste pass thro' the several mortars at regular times.

MILL for iron-work. See **SMITHERY**.

Sawing MILL. See the article **SAWING**.

Sugar-MILL. See the article **SUGAR**.

Tanning-MILL. See **TANNING-MILL**.

MILL-POOL, a stock or pond of water, by the force of which the motion of a water-mill is effected.

The dam of a mill pool is raised much in the same manner as directed for fish-ponds. See the article **FISH-POND**.

MILL-STONE, that used in mills, for grinding; being usually made of several species of psaduria, or free stone. See the article **PSADURIA**.

MILLAND, or **MILHAND**, a town of Guienne in France, sixty miles north-west Montpelier.

MILLENARIANS, or **CHILIASTS**, a name given to those, who, in the primitive ages, believed that the saints will one day reign on earth with Jesus Christ a thousand years. The former appellation is of latin original, the latter of Greek, and both of the same import.

The millenarians held, that after the coming of antichrist, and the destruction of all nations, which shall follow, there shall be a first resurrection of the just alone; that all who shall be found upon earth, both good and bad, shall continue alive; the good, to obey the just who are

risen, as their princes; the bad, to be conquered by the just, and to be subject to them: that Jesus Christ will then descend from heaven in his glory: that the city of Jerusalem will be rebuilt, enlarged, embellished, and its gates stand open night and day. They applied to this new Jerusalem, what is said in the Apocalypse, ch. xxi. and to the temple, all that is written in Ezekiel xxxvi. Here, they pretended Jesus Christ will fix the seat of his empire, and reign a thousand years with the saints, patriarchs and prophets, who will enjoy perfect and uninterrupted felicity.

This reign of our Saviour on earth is usually styled the millenium, or reign of a thousand years.

MILLEPES, the common WOOD-LOUSE, a species of the oniscus with a blunt forked tail. See the article **ONISCUS**. Its body is short and broad, approaching to an oval figure; it grows to near half an inch in length, and about half its length in diameter; its back is somewhat rounded, the belly flat; the colour a bluish grey; and the legs are seven or eight on each side, but the more usual number is seven. It runs nimbly, and on being touched rolls itself up to a kind of ball. It is common about old trees, and under logs of wood and stones.

The best way of taking these animals, is swallowing them alive; for as they roll themselves into a kind of pill, they easily slip down the throat untasted, and are immediately destroyed on falling into the stomach: this is the surest way of having all their virtues; the next to this is bruising them in wine, and taking the expression. They are sometimes dried, and given in powder, but in this state they lose the greater part of their virtues; however, if the patient can be prevailed on to take them no other way, the best method of preparing them, is that ordered in the New London Dispensatory, which is the tying them up in a thin canvas-cloth, and suspending them within a covered vessel, over the steam of hot spirit of wine; they are soon killed by this vapour, and rendered friable.

Millipedes are aperient, attenuant, and detergent; they dissolve viscous humours, are good in all obstructions of the viscera, and have even been celebrated by some writers as a remedy for the stone, which it is pretended they have a power of reducing to a mucilage, and carrying off. They are often found to be of service in

asthmas, and great good has been sometime done by a long course of them in disorders of the eyes.

MILLERIA, a genus of the syngenesia-polygamia class of plants, the compound flower of which is radiated; there is scarce any visible receptacle of the seeds, which are single after each particular flower, and have no pappus or down.

MILLET, *milium*, in botany, a genus of the triandria digynia class of plants, the calyx of which is a bivalve glume; the corolla is bivalve, shorter than the cup, and grows to the seed, which is single and roundish.

Millet-seed is accounted refrigerant and drying, and recommended in fluxes: it is also said to promote sweat and urine very powerfully.

MILLING, in the manufacture of cloth, the same with fulling. See **FULLING**. Milling of silk, is an operation otherwise called throwing.

MILLION, in arithmetic, the number of ten hundred thousand, or a thousand times a thousand. See the article **NUMBER** and **NUMERATION**.

MILLREE, a Portuguese gold-coin. See the article **COIN**.

MILO, or **MELO**, one of the islands of the Archipelago, sixty miles north of Candia.

MILT, in anatomy, a name sometimes given to the spleen. See **SPLEEN**.

MILT, or **MELT**, is also a denomination by which some call the rows of fishes.

MILTENBERG, a town of Germany, eighteen miles south of Aschaffenberg.

MILTON, the name of several market-towns, as one twelve miles north-east of Dorchester, and another twelve miles north-east of Maidstone.

MILVUS, the **KITE**, in ornithology, a species of falcon, with a forked tail, a yellow cere, a brown body, and a whitish head. It is a very common bird with us, about the size of a large tame pigeon. See the article **FALCON** and **KITE**.

MILVUS, in ichthyology, the same with the *hirundo piscis*, or swallow-fish. See the article **HIRUNDO**.

MIME, *μῖμος*, in the antient comedy, a person who acted any character by mere gestures, and hence denominated pantomime. See the article **PANTOMIME**.

MIMESIS, *μῖμῆσις*, in rhetoric, the imitating the voice and gestures of another person.

MIMOSA, the **SENSITIVE PLANT**, in botany. See the article **SENSITIVE**.

MIMULUS,

MIMULUS, in botany, a genus of the didynamia-angiospermia class of plants, with double stigmata, and a ringent monopetalous flower; the fruit is a bilocular capsule, with several seeds in each cell.

MIMUSOPS, in botany, a genus of the octandria-monogynia class of plants, the corolla of which consists of eight petals; and its fruit is a drupe.

MINA, in grecian antiquity, a money of account, equal to an hundred drachms. See **MONEY** and **DRACHM**.

MINCIO, or **MENZO**, a river of Italy, which, after running through the dutchy of Mantua, discharges itself into the Po, at Borgoforte.

MIND, *mens, vus*, a thinking intelligent being, otherwise called spirit, in opposition to matter or body. See the articles **BODY** and **SPIRIT**.

The culture of the human mind is more immediately taught in the sciences of logics and ethics. See **LOGIC** and **ETHICS**. When the mind, says Mr. Locke, turns its view inwards upon itself, thinking is the first idea that occurs; wherein it observes a great variety of modifications, whence it frames to itself distinct ideas. See **IDEA**. Thus the preception annexed to any impression on the body by an external object, is called sensation; when an idea recurs without the presence of the object, it is called remembrance; when sought after by the mind, and brought again into view, it is recollection; when the ideas are taken notice of, and as it were registered in the memory, it is attention; when the mind fixes its view on any one idea, and considers it on all sides, it is called study.

MINDANAO, the largest of the Philippine islands, except Luconia, is situated between 120° and 126° east longitude, and between 5° and 10° north lat.

MINDELHEIM, a city of Germany, thirty-three miles south east of Ulm. It is the capital of the principality of Mindelheim, conferred on the duke of Marlborough, by the emperor in 1704.

MINDEN, a city of Germany, the capital of a dutchy of the same name, situated forty miles west of Hanover.

MINDORA, one of the Philippine islands, lies south-west of Luconia, from which it is situated by a narrow channel.

MINE, in natural history, a place under ground, where metals, minerals, or even precious stones are dug up. See the article **DIGGING**.

As, therefore, the matter dug out of

mines is various, the mines themselves acquire various denominations, as gold-mines, silver-mines, copper-mines, iron-mines, diamond-mines, salt-mines, mines of antimony, of alum, &c. See the articles **GOLD**, **SILVER**, &c.

Mines, then, in general, are veins or cavities within the earth, whose sides receding from, or approaching nearer to, each other, make them of unequal breadths in different places, sometimes forming larger spaces, which are called holes: they are filled with substances, which, whether metallic or of any other nature, are called the loads; when the substances forming these loads, are reducible to metal, the loads are by the miners said to be alive; otherwise they are called dead loads. In Cornwall and Devon, the loads always hold their course from eastward to westward; though in other parts of England, they frequently run from north to south. The miners report, that the sides of the load never bear in a perpendicular, but constantly under-lay, either to the north or to the south. The load is frequently intercepted by the crossing of a vein of earth, or stone, or some different metallic substance; in which case it generally happens that one part of the load is moved a considerable distance to the one side. This transient load is by the miners called *flooding*; and the part of the load which is to be moved, is said to be heaved. See the article **FLOODING**. According to Dr. Nichols's observations upon mines, they seem to be, or to have been, the channels through which the waters pass within the earth, and, like rivers, have their small branches opening into them, in all directions. Most mines have streams of water running through them; and when they are found dry, it seems to be owing to the waters having changed their course, as being obliged to it, either because the load has stopped up the antient passages, or that some new and more easy ones are made.

Mines, says Dr. Shaw, are liable to many contingencies; being sometimes poor, sometimes soon exhaustible, sometimes subject to be drowned, especially when deep, and sometimes hard to trace; yet there are many instances of mines proving highly advantageous for hundreds of years: the mines of Potosi are to this day worked with nearly the same success as at first; the gold-mines of Cremonitz have been worked almost these thousand years; and our cornish tin-mines are extremely antient.

antient. The neat profit of the silver alone, dug in the misnian silver-mines in Saxony, is still, in the space of eight years, computed at a thousand six hundred and forty four millions, besides seventy-three tons of gold. Many mines have been discovered by accident: a torrent first laid open a rich vein of the silver-mine at Friberg in Germany; sometimes a violent wind, by blowing up trees, or overturning the parts of rocks, has discovered a mine; the same has happened by violent showers, earthquakes, thunder, the firing of woods, or even the stroke of a plough-share, or horse's hoof.

But the art of mining does not wait for these favourable accidents, but directly goes upon the search and discovery of such mineral veins, ores, or sands, as may be worth the working for metal. The principal investigation and discovery of mines depend upon a particular sagacity, or acquired habit of judging from particular signs, that metallic matters are contained in certain parts of the earth, not far below its surface. The principal signs of a latent metallic vein, seems reducible to general heads, such as, 1. The discovery of certain mineral waters. 2. The discolouration of the trees or grass of a place. 3. The finding of pieces of ore on the surface of the ground. 4. The rise of warm exhalations. 5. The finding of metallic sands, and the like. All which are so many encouragements for making a stricter search near the places where any thing of this kind appears; whence rules of practice might be formed for reducing this art to a greater certainty. But when no evident marks of a mine appears, the skilful mineralist usually bores into the earth, in such places as from some analogy of knowledge, gained by experience, or by observing the situation, course, or nature of other mines, he judges may contain metal: this method of boring we have already given under the article BORING.

After the mine is found the next thing to be considered, is whether it may be dug to advantage. In order to determine this, we are duly to weigh the nature of the place, and its situation, as to wood, water, carriage, healthiness, and the like, and compare the result with the richness of the ore, the charge of digging, stamping, washing, and smelting. See STAMPING, WASHING, and SMELTING. Particularly the form and situation of the

spot should be well considered. A mine must either happen, 1. In a mountain. 2. In a hill. 3. In a valley. Or, 4. in a flat. But mountains and hills are dug with much greater ease and convenience, chiefly because the drains and burrows, that is the adits or avenues may be here readily cut, both to drain the water and to form gang-ways for bringing out the lead, &c. In all the four cases we are to look out for the veins which the rains, or other accidental thing, may have laid bare; and if such a vein be found, it may often be proper to open the mine at that place, especially if the vein prove tolerably large and rich: otherwise the most commodious place for situation is to be chose for the purpose, *viz.* neither on a flat, nor on the tops of mountains, but on the sides. The best situation for a mine, is a mountainous, woody, wholesome spot; of a safe easy ascent, and bordering on a navigable river. The places abounding with mines are generally healthy, as standing high, and every where exposed to the air; yet some places, where mines are found, prove poisonous, and can, upon no account, be dug, though ever so rich: the way of examining a suspected place of this kind, is to make experiments upon brutes, by exposing them to the effluvia or exhalations to find the effects.

For the different veins, and the manner of tracing them, see the articles VEIN, and METALS.

Devonshire and Cornwall, where there are a great many mines of copper and tin, is a very mountainous country, which gives an opportunity in many places to make adits, or subterraneous drains, to some valley at a distance, by which to carry off the water from the mine, which otherwise would drown them out from getting the ore. These adits are sometimes carried a mile or two, and dug at a vast expence, as from 2 to 4000 l. especially where the ground is rocky; and yet they find this cheaper than to draw up the water out of the mine quite to the top, when the water runs in plenty, and the mine is deep. Sometimes, indeed, they cannot find a level near enough, to which an adit may be carried from the very bottom of the mine; yet they find it worth while to make an adit at half the height to which the water is to be raised, thereby saving half the expence; where being delivered into the trough L Z (pl. CLXXX. fig.

fig. 1.) it runs off under ground, without being drawn up to the mouth of the mine.

The late Mr. Costar, considering that sometimes from small streams, and sometimes from little springs, or collections of rain-water, one might have a pretty deal of water above ground, though not a sufficient quantity to turn an overshot-wheel, thought that if a sufficient fall might be had, this collection of water might be made useful in raising the water in a mine to the adit, where it may be carried off. The fall to be had, appeared to him to be C L (*ibid.*) the height of the mouth of the mine down to the adit, which we shall here suppose twenty-five yards. Then he contrived to place a rag-wheel R R, with its chain or bucket-pump, at the mouth of the mine C c, as represented in the figure; receiving the water, collected in the cistern W, thro' the pipe A, conveying it into the buckets B, making them go the reverse way (because in the common chain-pump, the rag wheel carries the buckets, but here the buckets carry the rag-wheel) down as far as the adit, into which they discharge themselves at b b; where turning another rag-wheel r r, whose axis works an engine that brings the water from the bottom, and delivers it into the adit L Z, which carries away both the waters to the opening at the bottom of the mountain, which we suppose at a great distance from the mine.

Any kind of engine may be worked by this lower rag-wheel, whose axis is H I (*ibid.*) as, for example, a common chain pump, by making the rag-wheel sufficiently deep; or cranks, as represented at Gg, working two pump-rods K, K, moving in the barrels M, M, and delivering their water into the trough L Z, leading to the adit.

N. B. There must be a wheel fixed to the axis of the upper rag-wheel at C, to carry a pinion or smaller wheel D, having a fly E F; in order to regulate the motion of the whole machine, and prevent jerks.

One considerable advantage may be reaped from a great fall of a small quantity of water, by fixing Dr. Barker's breast-wheel a little above the adit-cistern under ground. Let plate CLXXVII. fig. 1. be inverted, as at n° 3. *ibid.* and P P p p represents the bottom of a square perpendicular trough, that conveys the water to the mouth of the circular channel

G G, where the ladle-boards run in the direction 3, 4, 5, and quit the water at 6. A chain C c, pulling the shuttle M n, lets down the water upon the ladle-boards, in proportion to its quantity. The axis of this wheel, in going round, may be made to move any kind of water-work, to bring up the water from the bottom of a mine into the adit, there to be carried off.

MINE, in the military art, denotes a subterraneous canal, or passage, dug under the wall or rampart of a fortification, intended to be blown up by gun-powder. The alley or passage of a mine is commonly about four feet square; at the end of this is the chamber of the mine, which is a cavity about five feet in width and in length, and about six feet in height; and here the gun-powder is stowed. The faucisse of the mine, is the train, for which there is always a little aperture left. There are various kinds of mines, which acquire various names, as royal mines, serpentine-mines, forked-mines, according as their passages are straight, oblique, winding, &c. There are also mines made in the field, which are called fougades. See the article FOUGADE.

Mines are either dug within the body of the earth, as those made by the besieged to blow up the works of the besiegers, before they make a lodgment on the covered way; or in eminences and rising grounds, as to make a breach in the ramparts, &c. or to blow up walls, or lastly, to tear up rocks.

Two ounces of powder have been found, by experiment, capable of raising two cubic feet of earth; consequently two hundred ounces, that is twelve pounds eight ounces, will raise two hundred cubic feet, which is only sixteen feet short of a cubic toise, because two hundred ounces joined together, have proportionably a greater force than two ounces, as being an united force. See the article GUN-POWDER.

All the turnings a miner uses to carry on his mines, and through which he conducts the faucisse, should be well filled with earth and dung; and the masonry in proportion to the earth to be blown up, as 3 to 2. The entrance of the chamber of the mine ought to be firmly shut with thick planks, in the form of a St. Andrew's cross, so that the enclosure be secure, and the void spaces shut up with dung, or tempered earth. If a gallery be made below, or on the side of the chamber,

chamber, it must absolutely be filled up with the strongest masonry, half as long again as the height of the earth; for this gallery will not only burst, but likewise obstruct the effect of the mine. The powder should always be kept in sacks, which are opened when the mine is charged, and some of the powder strewed about: the greater the quantity of earth to be raised is, the greater is the effect of the mine, supposing it to have the due proportion of powder. Powder has the same effect upon masonry as upon earth, that is, it will proportionably raise either, with the same velocity.

The branches which are carried into the solidity of walls, do not exceed three feet in depth, and two feet six inches in width nearly; this sort of mine is most excellent to blow up the strongest walls.

The weight of a cubic foot of powder should be 80 lb. one foot one inch cube will weigh 100 lb. and one foot two inches and eleven twelfths, 150 lb. and 200 lb. of powder will be one foot five inches cube; however, there is a diversity in this, according to the quantity of salt peter in the gun-powder.

If, when the mines are made, water be found at the bottom of the chamber, planks are laid there, on which the powder is placed either in sacks or barrels, of 100 lb. each. The saucisse must have a clear passage to the powder, and be laid in an auget, or wooden trough, through all the branches. When the powder is placed in the chamber, the planks are laid to cover it, and others again across these; then one is placed over the top of the chamber, which is shaped for that purpose: between that and those which cover the powder, props are placed, which shore it up; some inclining towards the outside, others to the inside of the wall; all the void spaces being filled with earth, dung, brick, and rough stones. Afterwards planks are placed at the entrance of the chamber with one across the top, whereon they buttress three strong props, whose other ends are likewise propped against another plank situated on the side of the earth in the branch; which props being well fixed between the planks with wedges, the branch should then be filled up to its entrance with the forementioned materials. The saucisses which pass through the side branches must be exactly the same length with that in the middle, to which they join: the part which reaches beyond the entrance

of the mine, is that which conveys the fire to the other three; the saucisses being of equal length will spring together. From a great number of experiments, it appears, 1. That the force of a mine is always towards the weakest side; so that the disposition of the chamber of a mine does not at all contribute to determine this effect. 2. That the quantity of powder must be greater or less, in proportion to the greater or less weight of the bodies to be raised, and to their greater or less cohesion; so that you are to allow for each cubic fathom

Of loose earth, 9 or 10 lb.

Firm earth and strong sand, 11 or 12

Fat clayey earth, 15 or 16

New masonry, not strongly

bound, 15 or 20

Old masonry, well bound, 25 or 30

3. That the aperture, or entonnoir of a mine, if right charged, is a cone, the diameter of whose base is double the height taken from the center of the mine.

4. That when the mine has been overcharged, its entonnoir is nearly cylindrical, the diameter of the upper extreme not much exceeding that of the chamber. 5. That besides the shock of the powder against the bodies it takes up, it likewise crushes all the earth that borders upon it, both underneath and sideways.

To charge a mine so as to have the most advantageous effect, the weight of the matter to be carried must be known; that is, the solidity of a right cone, whose base is double the height of the earth over the center of the mine: thus having found the solidity of the cone in cubic fathoms, multiply the number of fathoms by the number of pounds of powder necessary for raising the matter it contains; and if the cone contains matters of different weights, take a mean weight between them all, always having a regard to their degree of cohesion.

As to the disposition of mines, there is but one general rule, which is, that the side towards which one would determine the effect be the weakest, but this varies according to occasions and circumstances. The calculation of mines is generally built upon this hypothesis, that the entonnoir of a mine is the frustum of an inverted cone, whose altitude is equal to the radius of the excavation of the mine, and the diameter of whose lesser base is equal to the line of least resistance; and though

though these suppositions are not quite exact, yet the calculation of mines deduced from them have proved successful in practice; for which reason this calculation should be followed, till a better and more simple be found out.

M. de Valliere found that the entonnoir of a mine was a paraboloid, which is a solid generated by the rotation of a semi-parabola about its axis; but as the difference between these two is very insignificant in practice, that of the frustum of a cone may be used. See the article PARABOLOIDES.

Knight of the MINE, a military honour anciently conferred on persons who had distinguished themselves in engagements in mines.

MINE Ships, ships filled with gun-powder, inclosed in strong vaults of stone or brick, to be fired in the midst of an enemy's fleet.

MINEHEAD, a borough and port-town of Somersetshire, which sends two members to parliament: west long. $3^{\circ} 20'$, north lat. $51^{\circ} 18'$.

MINERAL, in natural history, is used, in general, for all fossil bodies, whether simple or compound, dug out of a subterraneous mine, from which it takes its denomination. See FOSSIL and MINE. In this sense, metals, sulphurs, fossil salts, semi-metals, &c. are minerals. See the articles METALS, SULPHUR, &c.

Boerhaave defines minerals natural bodies, found either in the bowels or on the surface of the earth, of so simple a structure that the closest inspection, even by the best microscopes, has not been able to discover any diversity between the vessels and their contents; but each part appears similar to the whole, though in many of them there certainly is a composition of solid and fluid parts.

Upon this definition Dr. Shaw remarks, that the character holds of fossils, and of them alone: thus gold, silver, and the other metals, antimony, salts, sulphurs, stones, and other minerals, really grow fixed to the earth; and if they be divided into the minutest parts, they will every where appear of the same similar solid matter, without any shew of vessels or juices.

MINERAL Waters, in medicine, all those wherein any medicinal virtues, besides those of common water, are found.

These mineral waters are of various kinds, but they are considered under the general titles of chalybeate, purgative, VOL. III.

and alterative. The more useful and commodious additions for examining these three kinds of mineral waters, are, according to Dr. Shaw, galls, syrup of violets, and oil of tartar per deliquium. Galls discover in them any small proportion of vitriol or dissolved iron, as having the property of immediately striking a purple or black colour in all waters where any such substance is lodged. Spirit of violet, in the same manner, discovers any small predominancy of an acid or alkali therein, by changing the water red if acid, and green if alkali prevails. Oil of tartar discovers any small proportion of earthy matter less capable of dissolving in water than that salt, by precipitating such earthy matter in form of a white cloud to the bottom of the containing glass, where it collects and appears like a subtile white powder. These particulars may be shewn and proved satisfactorily by adding to pure water a little of a known acid, alkali, dissolved iron, and subtile earth, or fine light sediment of an earthy water; applying the syrup of violets, galls, and oil of tartar respectively.

Mineral waters are imitable by art. The rule is, by a proper analysis to find the contents of such water (by evaporation, the addition of tinging ingredients, &c. as above mentioned) and their proportions; then, by means of synthetical chemistry, to compose a similar mixture: thus, for example, we learn, by a proper analysis, that the ingredients, or different constituent parts of pyrmont-waters, are a subtile aqueous fluid, a volatile iron, and a predominating alkali, all joined together in one brisk pungent spirituous water. The imitation of this kind of chalybeate water, is by much the most difficult, and may perhaps be rendered most perfect, by boiling the purest common water in a close vessel, with a small proportion of ochre, soft iron ore, or pyrites. See the articles PYRMONT and CHALYBEATE.

The imitation of the common purgative mineral waters is easy: thus Epsom-water is imitated by barely dissolving three or four drams of Epsom salt in a quart of pure water, made somewhat brisk or quick with a few drops of spirit of vitriol and oil of tartar per deliquium, so as to let the alkali prevail. See the articles EPSOM and PURGATIVE.

The imitation of the alterative waters, such as those of Bath, Buxton, &c. has

hitherto scarce been attempted; nor can be rationally, for want of their respective just analysis, upon which such imitations shou'd always be grounded. See the articles BATH, BUXTON, &c.

As to the use of mineral waters, the learned Heister observes, that in general they are found to agree much better with persons in the middle stages of life, than with persons very old or very young. If any general rule can be given in this case, it is, that people should not take them when younger than eighteen, or older than sixty.

As to the method of taking them, people who are of a plethoric habit ought to be blooded before they begin to take them, but all persons ought to take a gentle purge before they begin them, in order to clear the primæ viæ; and to this purpose, nothing is more proper than the common salis of Epsom or Glauber's. If there be indications for vomiting in the patient, such as pains, and a sensation of weight, in the stomach, with bitterness in the mouth, then it is extremely proper to give, a day or two before the beginning of the courses of the waters, a gentle dose of ipecacuanha. The most proper time for drinking them, is early in the morning; six or seven o'clock is very proper. The most proper season is the summer, in the months of June, July and August; but in urgent occasions, the course of them may be begun in May and continued till September. It is always proper to begin the use of them by small quantities, and gradually increase them to larger; the first day it may be proper to drink about a pint and a half, the second a quart may be drank, and on the third or fourth three pints. After this the quantity may be increased to two quarts a day; and more than this it is not proper to take, unless the person be of a very robust habit: the quantity that is taken as the most may be continued every day till the course is finished, if the nature of the disease require it. In general, the mineral waters operate both by stool and urine, but in some they operate by stool singly, in others by urine.

MINERVALIA, in roman antiquity, festivals celebrated in honour of Minerva, in the month of March; at which time the scholars had a vacation, and usually made a present to their masters, called from this festival minerval.

These festivals were otherwise called

quinquatria, from their lasting five days. See the article QUINQUATRIA.

MINHO, a great river of Spain, which, taking its rise in Galicia, divides that province from Portugal, and falls into the Atlantic at Caminha.

MINIATO, a town of Italy, fifteen miles west of Florence.

MINIATURE, a delicate kind of painting, distinguished from all others by the smallness of the figures, its being performed with dots or points, instead of lines; by the faintness of the colouring; its requiring to be viewed very near; and by its being usually done on vellum. See PAINTING and REDUCTION.

This is the nicest and most tedious of all kinds of painting, being performed wholly with the point of the pencil: for when the colours are laid on flat without dotting, though the figures be small, and the ground either vellum or paper, it is not called painting in miniature, but washing. There are some painters who never use any white colour in painting in miniature, but make the ground of the vellum serve to raise their figures; in which case the lights appear bright in proportion to the depth and strength of the colours of the figures. Others, before they go to work, give the vellum a light wash with white-lead well prepared and purified. Those colours that have the least body, are the best and most commodious for painting in miniature; as carmine, ultramarine, fine lakes, and greens made of herbs and flowers; but besides these, the following colours are also made use of, *viz.* vermilion, black-lead, brown-red, masticote-pale, yellow-masticote, indigo, ivory-black, lamp-black, spanish-brown, umber, gall-stone, brown-ochre, french-pink, orpiment, gamboge, naples yellow, bladder-green, verditer, sea-green, german-ashes, flake-white, and white-lead. All terrene colours, and other gross substances, are too coarse for fine work, how well soever they may be ground; but the finest particles may be separated by tempering the colour in a cup of fair water, and having stirred it well with your finger, and the whole being thoroughly mixed, let it subside for a while, and then pour it by inclination into a shell that has been well scowred in hot water, and let it stand to dry. Yellow-ochre, brown-red, umber, and ultramarine purify by fire; but if they are burnt in too fierce a fire they change,

change, and the brown-red turns yellow; the yellow ochre and umber turn reddish, and so of the rest: if the fire is not too fierce it renders them softer and kinder than before, so that the finest and purest ultramarine, burnt in a red-hot shovel, becomes much more brilliant than it was before it was burnt. Greens, blacks, greys and yellows, on being mixed with a little of the gall of the ox, carp, or eel, especially of the last, acquire a lustre and vivacity not natural to them. You must take the galls of eels and hang them on a nail to dry; and when you use any, steep it in brandy, and mingle some of it with the colour already tempered with gum-water in which there is a little sugar-candy. When you begin to paint, the colours must be placed on a small ivory-pallet of the size of your hand, in the middle of which should be placed the white; well spread out, and near it the lighter, and further off those darker colours you are going to use.

Your vellum must be glued to a copper-plate, or a piece of thin board, exactly of the same size with the intended piece; in doing which, the fair side of the vellum should be moistened with a fine wet linen; and a piece of white paper being put upon the back of it, it is to be applied to the plate or board, and stretching it upon it equally in all directions, the vellum, which ought to be every way a finger's breadth larger than what you glue it to, in order to be doubled over and glued behind. When your piece is sketched out upon the vellum, with a pencil, you must, with a little thin carmine, run over all the strokes that they may not be defaced in working, and this done clean your vellum with crumb of bread. In laying on the colours, begin with sketching or drawing with large, bold, but clear strokes, like those who paint in oil: your lights must at first be something brighter, and your shades not quite so dark as is required in finishing; because in stripping upon them you strengthen the colour, which if too deep at first, would in finishing become too dark. Endeavour also to drown your colours into each other, that no line of separation may be seen between them; to this purpose soften your strokes with the colours on each side of them, so that they may be blended and confounded with each other. There are several ways of stripping, and every painter has his manner; some do it with round points,

others make them longish; others again hatch fine strokes, crossing each other in all directions, till the whole appears as if stripped or wrought with points; this last method is the best, boldest, and soonest perfected: the artist should here accustom himself to be rich, mellow, and soft in his work; the points must seem in a manner lost in the ground they are wrought upon, and appear but just enough to shew that the piece is stripped. When the work seems finished, heightening it a little has a fine effect; that is, strengthening the lights with touches of a paler colour than at first, which must be softened away into the rest.

For laces, point, and the like, lay on first a mixture of blue, black, and white, as for linens, and then heighten the pattern, flowers or flourishes, with white only; then shade and finish with the first colour. When they are upon flesh, or any thing else which you would have seen through them, finish what is under them, as if you intended to lay nothing upon it, and then lay on the lace or point with pure white, and finish with the other mixture. In painting a fur, lay on a ground as for drapery, according to the colours of it, and then shade by the same rule; and having done, instead of stripping, draw fine strokes this way and that, according as the down of the fur you imitate lies: heighten the lights of of a brown fur with ochre and white, and those of a light fur with white and a little blue.

There are several sorts of grounds for pictures and portraits; some are quite brown, with spanish-brown, umber, &c. with a little black and white; others are more yellow, being mixed with a good deal of ochre; others are upon the grey, with indigo; and others are blue or crimson. See the article GROUND.

To make a ground all of glory, first lay a bright mixture of a little ochre and white, adding more and more of the first as you draw more and more towards the extremities of the intended picture; and when the ochre happens not to be dark enough (for you must go on darkening and darkening) add gall-stone, then carmine, and at last spanish-brown. This ground you must lay in such a manner, that the different degrees of darkness may, as much as possible, insensibly increase and strengthen; the whole must then be stripped with the same colours. For a day-sky, mingle some ultramarine

with a good deal of white, and lay it on as smooth and uniform as possible with a large pencil and broad strokes, laying it on paler and paler as you descend towards the horizon, which must be made of vermillion, m^e-de-plumb and white, of the strength that finishes the sky, or rather a little weaker, artfully blending the blue and red, mingling at last gall-stone and a good deal of white; and all this must be so laid on that no separation must be seen between the colours. When there are to be clouds in the sky, you need lay on no blue where they are to be, but sketch them out, if they are reddish, with vermillion, gall-stone, and white, together with a little indigo; and if they are to be darker, a great deal must be used of this last, making the lights of the one and the other with masticot, vermillion and white, according to the degree of strength you would give them, swelling out the whole with strippling; and if the sky be not sufficiently uniform, you must stripple that likewise.

MINIM, in music, a note equal to two crotchets, or half a semibreve. See the articles **NOTE**, **CROTCHET**, &c.

MINIMS, a religious order in the church of Rome, founded by St. Francis De Paula, towards the end of the fifteenth century. Their habit is a coarse black woollen stuff, with a woollen girdle, of the same colours, tied in five knots. They are not permitted to quit their habit and girdle night nor day. Formerly they went bare-footed, but are now allowed the use of shoes.

MINIMUM, in the higher geometry, the least quantity attainable in a given case. See the article **MAXIMUM**.

MINION, a piece of cannon, at present but little used in the field. For its length, bore, and the weight of the ball it carries, see **CANNON**.

M'NISTER, a person who preaches, performs religious worship in public, administers the sacraments, &c. See the articles **BISHOP**, **DEACON**, &c.

MINISTER of state, a person to whom a sovereign prince intrusts the administration of the government.

Foreign MINISTER, is a person sent into a foreign country to manage the affairs of his province, or of the state to which he belongs. Of these there are two kinds; those of the first rank are ambassadors and envoys extraordinary, who represent the persons of their sovereigns. The mi-

nisters of the second rank are the ordinary residents. See **EMBASSADOR**, &c.
MINIUM, or **RED-LEAD**, a preparation of lead used both in pharmacy and painting. It is made in the following manner: melt lead in a broad earthen vessel unglazed, and stir it continually with a spatula till it be calcined into a grey powder; this is called the calx of lead; continue the fire, stirring it in the same manner, and it becomes yellow; in this state it is called masticot: after this put it into a reverberatory furnace and it will calcine farther, and become of a fine red, which is the common minium or red-lead. Minium is used externally on many occasions. It obtunds the acrimony of the humours, allays inflammations, and is excellent in cleansing and healing old ulcers; and on these occasions, it is used in many of the plasters and ointments of the shops.

In painting, red-lead is as heavy and strong a colour as most we have; but when prepared, is the most delightful one. Mr. Boyle directs the preparing it as follows: put four ounces of it in a quart of rain-water; then stir it, and pour off the water immediately, and let it settle to the bottom of every cup or glass you pour it into; then pour off the water, and in a day's time you will have the colour dry, and as fine as you can desire. Some shade red-lead with carmine, which has a fine effect, and renders it equal to the brightest red flower: when the carmine has shaded the red-lead, it may be shaded again with lake in the strongest part.

MINOR, in law, is an heir, either male or female, before they arrive at the age of twenty-one; during the minority of such, they are usually incapable of acting for themselves. See **INFANT**.

MINOR, in logic, the second proposition of a regular syllogism. See **SYLLOGISM**.

MINOR, in music, signifies less, and is applied to certain concords or intervals which differ from others of the same denomination by half a tone: thus we say a third minor, meaning a less third; a sixth major and minor. See the articles **SIXTH** and **THIRD**.

Concords that admit of a major and minor, are called imperfect. See the article **CONCORD**.

MINORCA, an island in the Mediterranean, about twenty miles east of Majorca, thirty miles long, and twelve broad,

broad. It is subject to Great Britain, and only valued for its capacious harbour of Port Mahon.

MINORS, or FRIARS-MINOR, the same with franciscans. See FRANCISCAN.

MINOTAUR, *minotaurus*, in antiquity, a fabulous monster much talked of by the poets, feigned to be half man and half bull.

The minotaur was brought forth by Pasiphae, wife of Minos, king of Crete. It was shut up in the labyrinth of that island, and at last killed by Theseus.

Servius gives the explanation of this fable: he says that a secretary of king Minos, named Taurus, bull, having an intrigue with the queen Pasiphae, in the chamber of Dædalus, she was at length delivered of twins; one of whom resembled Minos, and the other Taurus. This occasioned the production to be reputed monstrous.

MINOVERY, a trespass committed in the forest, by something that is a man's handy work, as an engine to catch deer, &c. See the article FOREST.

MINOW, in ichthyology, a small species of cyprinus, too well known to need a particular description. See CYPRINUS.

MINSTER, antiently signified the church of a monastery or convent.

MINSTREL, an antient term for a fidler, or player on any other kind of musical instrument.

MINT, the place in which the king's money is coined. See COINAGE.

There were antiently mints in almost every county in England; but the only mint at present in the british dominions, is that in the Tower of London. The officers of the mint are, 1. The warden of the mint, who is chief; he oversees the other officers, and receives the bullion. 2. The master worker; who receives the bullion from the warden, causes it to be melted, delivers it to the moneyers, and when it is coined receives it again. 3. The comptroller, who is the overseer of all the inferior officers, and sees that all the money is made to the just assize. 4. The assay-master; who weighs the gold and silver, and sees that it is according to the standard. 5. The auditor; who takes the accounts. 6. The surveyor of the melting; who after the assay-master has made trial of the bullion, sees that it is cast out, and not altered after it is delivered to the melter. 7. The engraver; who engraves the stamps and dyes for the coinage of the

money. 8. The clerk of the irons; who sees that the irons are clean and fit to work with. 9. The melter; who melts the bullion before it is coined. 10. The provost of the mint; who provides for, and oversees all the moneyers. 11. The blanchers; who anneal and cleanse the money. 12. The moneyers; some of whom forge the money, some shear it, some round and mill it, and some stamp or coin it. 13. The porters; who keep the gate of the mint.

MINT, *mentha*, in botany, a genus of the diynamia angiosperma class of plants, the flower of which is monopetalous, and divided into four segments at the limb: there is no pericarpium, the seeds being contained in the bottom of the cup.

Under this genus are comprehended the mentha, menthastrum, and pulegium, or penny-royal of authors; all which are esteemed aperient and cephalic. Pepper-mint is highly extolled as a stomachic and carminative: as is also spear-mint. The distilled water of this plant is given in flatulencies, and colics arising from that kind of cause.

MINUARTIA, in botany, a genus of the triandria trigynia class of plants, the calyx of which is a long, erect, five leaved perianthium. It has no corolla; the fruit is an oblong triangular capsule, composed of three valves, and containing one cell, in which are a few roundish, compressed seeds.

MINUET, in music, a very graceful kind of dance, which consists of a couplee, a high step, and a balance; it begins with a beat, and its motion is triple.

It has commonly two strains, each played twice over; the first has four or eight bars, the last of which should be either the dominant or mediant of the mode, but never the final: the second has eight bars, and usually ends on the final of the mode, with a pointed minim, or whole bar.

MINUSCULE, the small letters, in contradistinction to the majusculæ or capitals.

MINUTE, in geometry, the sixtieth part of a degree of a circle. See the articles CIRCLE and DEGREE.

Minutes are denoted by one acute accent, thus ('); as the second, or sixtieth part of a minute, is by two such accents, thus ("); and the third by three (""), &c.

MINUTE of time, the sixtieth part of an hour. See the article HOUR.

MINUTE,

MINUTE, in architecture, usually denotes the sixtieth, sometimes the thirtieth part of a module. See the article **MODULE**.

MINUTE is also used for a short memoir, or sketch of a thing, taken in writing.

MIRABILIS, MARVEL OF PERU, in botany, a genus of the pentandria monogynia class of plants, with a monopetalous funnel-fashioned flower; its fruit is an ovato-pentagonal nut, containing a single globose seed.

Tournefort and Linnæus will have the root of this plant to be the jalap of the shops; but Houston declares, that jalap is the root of a species of convolvulus.

See the article **JALAP**.

MIRACLE, is defined by Dr. Samuel Clarke, to be a work effected in a manner different from the common and regular method of providence, by the interposition either of God himself, or some intelligent agent superior to man.

It has been much controverted, whether true miracles can be worked by any less power than the immediate power of God; and whether to complete the evidence of a miracle, the nature of the doctrine pretended to be proved by it, is necessary to be taken into the consideration. The above learned author undertakes to set this matter in a clear light, as follows.

In respect to the power of God, and the nature of the things themselves, all things that are possible at all, are equally easy to be done: it is at least as great an act of power to cause the sun to move at all, as to cause it at any time to stand still; yet this latter we call a miracle, the former not.

What degrees of power God may reasonably be supposed to have communicated to created beings, or subordinate intelligences, is impossible for us to determine: therefore a miracle is not rightly defined to be such an effect as could not have been produced by any less power than the divine omnipotence. There is no instance of any miracle in Scripture, which to an ordinary spectator would necessarily imply the immediate operation of original, absolute, and undeviated power.

All things that are done in the world, are done either immediately by God himself, or by created intelligent beings, matter not being at all capable of any laws or powers whatsoever; so that all those things which we say are the effects of the natural powers of matter and laws of motion, are properly the effects of God

acting upon matter continually and every moment, either immediately by himself, or mediately by some created intelligent beings. Consequently it is no more against the course of nature for an angel to keep a man from sinking in the water, than for a man to hold a stone from falling in the air, by overpowering the law of gravitation; and yet the one is a miracle, the other not so.

The only possible ways by which a spectator may certainly and infallibly distinguish whether miracles be the works either immediately of God himself, or of some good angel employed by him; or whether, on the contrary, they are the works of evil spirits, are these: if the doctrine attested by miracles, be in itself impious, or manifestly tending to promote vice; then, without all question, the miracles, how great soever they may appear to us, are neither worked by God himself nor by his commission. If the doctrine itself be indifferent, and, at the same time, there be worked other miracles, more and greater than the former, then that doctrine which is attested by the superior power, must necessarily be believed to be divine: this was the case of Moses and the egyptian magicians. If, in the last place, the doctrine attested by miracles tends to promote the honour of God, and the practice of righteousness among men; and yet nevertheless be not in itself demonstrable, nor could without a revelation be discovered to be actually true; and there is no pretence of more and greater miracles to contradict it; which is the case of the doctrine and miracles of Christ; then the miracles are unquestionably divine, and the doctrine must, without all controversy, be acknowledged as an immediate and infallible revelation from God.

The lord Bacon observes, that a miracle was never wrought by God to convert an atheist, because the light of nature might have led him to confess a God: but miracles, says he, are designed to convert idolaters, and the superstitious, who have acknowledged a deity, but erred in the manner of adoring him; because no light of nature extends so far as fully to declare the will and true worship of God. Acoſta enquiring into the cause why miracles are not wrought by the present missionaries for the conversion of heathen nations, as they were by the christians of the primitive ages, gives this as one reason; that the christians at first were ignorant

Fig. 3. MNIMUM.

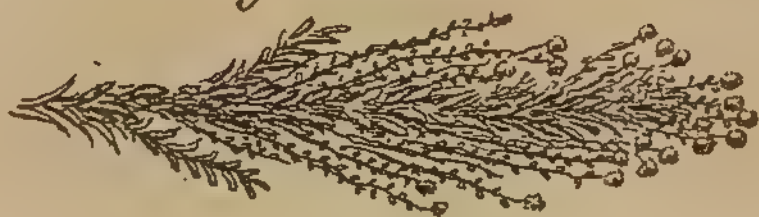


Fig. 1. Costar's Engine for raising Water out of MINES

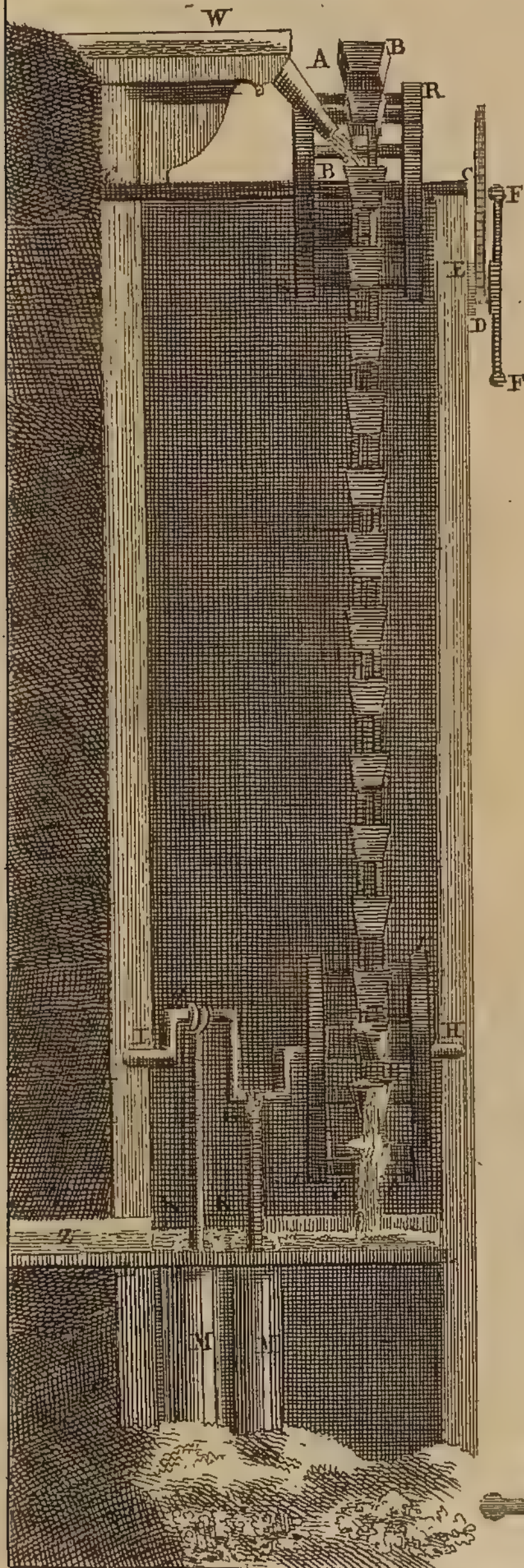
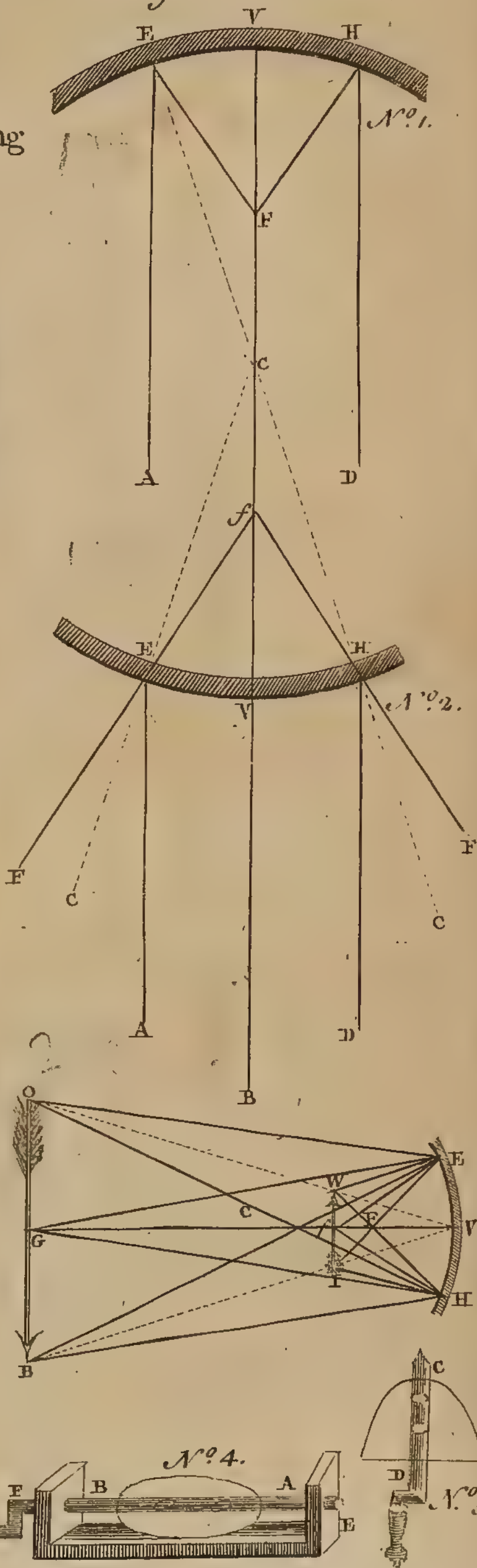


Fig. 2. MIRROURS.





norant men, and the gentiles learned; but now, on the contrary, all the learning in the world is employed in the defence of the Gospel, and there is nothing but ignorance to oppose it; and there can be no need of farther miracles in so good a cause, when it is in the hands of such able advocates against such weak adversaries.

MIRALETUS, in ichthyology, a species of ray fish, commonly called *raja oculata*, with a row of spines round the eyes. See the article **RAJA**.

MIRANDA de Douro, a city of Portugal, in the province of Tralos Montes, situated on the Douro: west longitude $6^{\circ} 45'$, north latitude $41^{\circ} 30'$.

MIRANDA de Ebro, a town of old Castile, in Spain: situated on the river Ebro, forty-two miles north-east of Burgos: west long. $3^{\circ} 30'$, north lat. 43° .

MIRANDOLA, a city of Italy, sixteen miles north of Modena.

MIRECOUR, a town of Lorrain, twenty-two miles south of Nancy.

MIREPOIX, a city of Languedoc, in France, thirty-two miles south-east of Toulouse.

MIRROUR, *speculum*, in catoptrics, any polished body, impervious to the rays of light, and which reflects them equally.

Mirrors were antiently made of metal; but, at present, are generally smooth plates of glass, tinned or quicksilvered on the back part, and called looking-glasses.

The doctrine of mirrors depends wholly on that fundamental law, that the angle of reflection is always equal to the angle of incidence. See **INCIDENCE**.

Let *E H* (plate **CLXXX**, fig. 2. n^o 1.) be a concave mirror, *V* its vertex, and *C* the center of its concavity. Let *A* be a ray of the sun's light incident on the point *E*, and draw *E C*, which will be perpendicular to the mirror in the point *E*; make the angle *C E F* equal to the angle *A E C*, then shall *E F* be the reflected ray. Thus also *H F* will be the reflected ray of the incident one *D H*, at an equal distance on the other side of the axis *B V*.

If now the points *E* and *H* be taken very near the vertex *V*, we shall have *E F*, or *H F*, very nearly equal to *F V*; but *E F* = *F C*; therefore $F V = F C = \frac{1}{2} C V$. That is, the focal distance *F V* of parallel rays will be at the distance of half the radius *C V* of the concavity of the mirror, from the vertex *V*, in the axis *B V*. After the same manner, a convex mir-

ror is shewn to reflect the rays *A E*, *D H*, (*ibid.* n^o 2.) into *E F*, *H F*, as if they came diverging from a point *f* in the axis *C V*, which is half the radius *C V* distant from the vertex *V*. But since the rays do not actually come at, or from the focus *f*, it is called the imaginary or virtual focus. See **FOCUS**.

Parallel rays falling directly on a plane speculum are reflected back upon themselves; if they fall obliquely, they are reflected in the same angle, and parallel as they fell. Hence there is no such thing, properly speaking, as a focus belonging to a plane speculum, neither real nor virtual.

The focus *F*, or *f*, of parallel rays, is called the solar focus; because in that the image of the sun is formed, and of all objects very remote. But the focus of any object situated near the mirror will have its distance from the vertex more or less than half the radius; the rule in all cases being as follows:

Multiply the distance of the object into the radius of the mirror, and divide the product by the sum of the radius and twice the distance of the object; the quotient will be the focal distance of a convex mirror.

Again for a concave mirror, the same product of the radius into the distance of the object, divided by the difference of radius and twice the distance of the object, will give the focal distance *V F* or *V f*. And here we are to observe, that, as twice the distance of the object is lesser or greater than the radius, so the focus will be positive or negative, that is, behind the glass or before it.

The image of the object is formed in the focus proper to its distance: and, since the writers on optics demonstrate that the angles under which the object *O B* (*ibid.* n^o 3.) and its image *I W* are seen from the center or vertex of the mirror *C* are always equal, it follows, that the image *I W* will be always in proportion to the object *O B*, as the focal distance *V F* to the object's distance *G V*. The position of the object will be always erect at a positive focus, or behind the speculum; diminished by a convex, and magnified by a concave one. Hence, since a convex has but one, *viz.* an affirmative focus; so it can never magnify any object, howsoever posited before it.

The position of the image in a negative focus, or that before the glass, will be ever inverted; and, if nearer the vertex than

the

the center C, it will be less; if farther from it, it will be greater than the object; but in the center it will be equal to the object, and seem to touch it.

The image formed by a plane speculum is erect; large as the life; at the same apparent distance behind the glass as the object is before it; and on the same side of the glass with the object. Those properties render this sort of mirror of most common use, *viz.* as a looking-glass.

If the rays fall directly, or nearly so, on a plane mirror, and the object be opaque, there will be but one single image formed, or at least be visible; and that by the second surface of the speculum, and not by the first, through which the rays do most of them pass.

But if the object be luminous, and the rays fall very obliquely on the speculum, there will be more than one image formed, to an eye placed in a proper position to view them. The first image being formed by the first surface will not be so bright as the second, which is formed by the second surface. The third, fourth, &c. images are produced by several reflections of the rays between the two surfaces of the speculum; and, since some light is lost by each reflection, the images from the second will appear still more faint and obscure, to the eighth, ninth, or tenth, which can scarcely be discerned at all.

Mirrors may be divided into plane, concave, convex, cylindrical, conical, parabolical, and elliptical.

The best manner of preparing convex mirrors hitherto known is given us by Wolsius, thus:

Melt one part of tin, another of marcasite, together, and to this mass add two parts of mercury; as soon as the mercury begins to evaporate into smoke, the whole is to be thrown into cold water, and, when well cooled, the water decanted off. Strain the mixture through two or three folds of linen cloth; and what is thus secreted pour into the cavity of a glass sphere, which is to be turned gently round its axis till the whole surface be covered; the rest being reserved for future use. If the sphere were of coloured glass, the mirror will be so too. And in like manner may conic, elliptic, cylindric, and other mirrors be made. See the article FOLIATING.

For elliptical, parabolical, and hyperbolical mirrors, the mould is to be thus

prepared; on a wooden or brass-plane describe an ellipsis A B (*ibid.* n^o 4.) also a parabola or hyperbola, C D (*ibid.* n^o 5.) then cut out the figure from the plane with all the accuracy imaginable.

To the elliptic figure fit an axis, as E F, with two fulcra to sustain it, &c. and a handle to move it. Lay a quantity of the clay under it, and turn about the axis by the handle, till the plane A B have impressed the elliptical figure exactly thereon.

The axis of the parabolical or hyperbolical figure C D is to be fixed at the vertex so as to be always erect. This is to be turned about, till it have given its figure to the clay round it.

The part of the mould thus formed is to be dried, and then smeared over with fat, &c. then a convex mould is to be made by putting a quantity of the same clay into the cavity thus formed. The latter is called the male, as the former is the female mould. The male mould, when dry, is to be applied within the female, so as to leave the intended thickness of the mirror between them. These mirrors are very difficult to be made, as the figure thereof is apt to be damaged in the grinding. See the article GRINDING.

The properties of cylindrical mirrors are, 1. The dimensions of objects corresponding lengthwise to the mirror are not much changed; but those corresponding breadthwise have their figures altered and their dimensions lessened the farther from the mirror; whence arises a very great distortion. 2. If the plane of the reflection cut the cylindric mirror thro' the axis, the reflection is performed in the same manner as in a plane mirror; and if parallel to the base, the reflection is the same as in a spherical mirror; if it cut it obliquely, the reflection is the same as in an elliptic mirror. Hence, as the plane of reflection never passes thro' the axis of the mirror, except when the eye and objective line are in the same plane; nor parallel to the base, except when the radiant point and the eye are at the same height; the reflection is therefore usually the same as in an elliptic one. 3. If a hollow cylindric mirror be directly opposed to the sun, instead of a focus of a point, the rays will be reflected into a lucid line parallel to its axis, at a distance somewhat less than a fourth of its diameter. Hence arises a method of drawing anamorphosis,

morphoses, that is, wild deformed figures on a plane, which appear well proportioned, when viewed in a cylindric mirror. In an elliptic mirror, if a ray strike on it from one of its focuses, it is reflected into the other.

In parabolic mirrors, as all the rays they reflect meet in one point, they make the best burning-glasses.

MIS, a negative particle prefixed to words, particularly law-terms, generally signifying a fault or defect; as misprison, misnomer, &c. See MISPRISION, &c.

MISADVENTURE, in law, is by some taken to signify the killing a person partly by negligence, and partly by chance, as where a person is killed by a stone thrown at random: other lawyers define it, a person's coming to his death by some accidental outward violence, as by a stroke of a horse, the fall of a tree, or the like.

MISCHNAH, or MISNAH, the code or collection of the civil law of the Jews. The Jews pretend, that when God gave the written law to Moses, he gave him also another not written, which was preserved by tradition among the doctors of the synagogue, till rabbi Judah, surnamed the Holy, seeing the danger they were in, through their dispersion, of departing from the traditions of their fathers, judged it proper to reduce them to writing.

The mishnah is divided into six parts: the first relates to the distinction of seeds in a field, to trees, fruits, tythes, &c. The second regulates the manner of observing festivals: the third treats of women, and matrimonial cases: the fourth of losses in trade, &c. the fifth is on obligations, sacrifices, &c. and the sixth treats of the several sorts of purification. See the article TALMUD.

MISCONTINUANCE, in law, the same with discontinuance. See the article DISCONTINUANCE.

MISDEMEANOUR, in law, signifies a heinous offence or fault, particularly in the execution of an office.

MISE, in law-books, is used in various senses: thus it sometimes signifies costs or expences, in which sense it is commonly used in entering of judgments in actions personal. It is also used for the issue to be tried on the grand assize, in which case, joining of the mise upon the meer right, is putting in issue between the tenant and demandant, who has the best or clearest right.

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Mise also signifies a tribute, or customary present formerly paid in the county-palatine of Chester, on the change of every owner of that earldom, for the enjoyment of their liberties.

MISEN, or MIZEN, in a ship. See the article MIZEN.

MISERERE MEI, in medicine, a name by which some call the iliac passion. See the article ILIAC.

MISERICORDIA, in law, is an arbitrary fine imposed on any person for an offence: this is called misericordia, because the amercement ought to be but small, and less than that required by magna charta. If a person be outrageously amerced, in a court that is not of record, the writ called moderata misericordia lies for moderating the amercement according to the nature of the fault.

MISITHRA, or LACEDÆMON. See the article LACEDÆMON.

MISFEASANCE, in law-books, signifies a trespass. See the article TRESPASS.

MISLETOE, *viscum*, in botany. See the article VISCUM.

MISNAH, or MISCHNAH. See the article MISCHNAH.

MISNIA, or MEISSEN. See MEISSEN.

MISNOMER, in law, a misnaming, or mistaking a person's name. The christian name of a person should always be perfect, but the law is not so strict and precise in regard to surnames, a small mistake in which will be dispensed with to make good a contract, and support the act of the party.

MISPRISION, signifies, in general, some neglect or oversight; as where a person is privy to a treason or felony committed by another, and neglects to reveal it to the king or his council, or to a magistrate; but entirely conceals it: this is called misprison of those crimes. In cases of misprison of treason, the offender is to be imprisoned for life, and to forfeit his goods and chattels, together with the profits of his lands, &c. but in misprison of felony, the offender is only to be punished with fine and imprisonment, and to remain in prison till the fine is paid.

The word misprison, is taken for many great offences which are not treason or felony, but nearly allied to them; and all great misdemeanors that have no certain name appointed by the law, have sometimes been called misprison. There is also misprison at large, where a per-

son contemns the king's prerogative by refusing to assist him, by writing or speaking against his person or government, refusing to take the oaths of allegiance and supremacy, &c.

MISSA, the mass. See **MASS**.

MISSAL, the romish mass-book, containing the several masses to be said on particular days. See the article **MASS**.

MISSEL-BIRD, the english name of the greyish-yellow turdus, with a spotted breast. See the article **TURDUS**.

It is the largest bird of the turdus-kind, known among authors by the name of *turdus viscivorus major*.

MISSEN, or **MIZEN**, in a ship. See the article **MIZEN**.

MISSIONARIES, such ecclesiastics as are sent by any christian church, into pagan or infidel countries, to convert the natives, and establish the christian religion among them.

There are in France, and other popish countries, several congregations of missionaries, whose principal end is to be employed on missions, and to inspire into the young clerks that spirit of piety and devotion which is necessary for the worthy discharge of their ministry. Such are the congregations of the priests of the mission, the eudists, the missionaries of Lyons, and some others. The most remarkable of these congregations is that of the priests of the mission, which consists of secular clergy; who nevertheless make four simple vows, of poverty, chastity, obedience, and perseverance. Their habit is distinguished from that of other ecclesiastics only by a linen collar four fingers broad, and by their wearing a little tuft of beard.

MISSIVE, something sent to another, as missive letters; meaning letters sent from one to another upon business, in contradistinction to letters of gallantry, points of learning, dispatches, &c.

MIST, the same with fog. See **FOG**.

MISUSER, in law, signifies some abuse of any particular liberty or benefit. The charter of a corporation, as well as an office, may be forfeited by misuser.

MISY, in natural history, a species of the chalcantha, a fossil very common in the turkish dominions, and sometimes found in the mines at Cremnitz in Hungary. See the article **CHALCANTHA**.

It is a considerably firm substance, of an irregular texture, not compact, much resembling some of our more gaudy marchasites, but wanting in their hard-

ness and weight. It is of no determinate shape or size, but is oftentimes found in small detached masses, which are usually broad, flat, and very rugged at the edges. As to its medical virtues, they are no other than those of the green vitriol. See the article **VITRIOL**.

MITCHELLA, in botany, a genus of the tetrandria monogynia class of plants, the calyx of which consists of two flowers, placed upon the germen, the corolla is monopetalous, and funnel-shaped; the fruit is a bipartite, globose berry; the seeds are compressed, and callous.

MITE, a small coin formerly current, equal to about one third part of a farthing. It also denotes a small weight used by the moneyers. It is equal to the twentieth part of a grain, and is divided into twenty-four doits.

MITE, in zoology. See **ACARUS**.

MITELLA, in botany, a genus of the decandria digynia class of plants, the corolla whereof consists of five patent petals, of an oblong figure, longer than the segments of the cup, with their ungues narrow, and inserted into the calyx: the fruit is a capsule of a globose figure, but with a point formed of two valves, and opening between, containing only one cell: the seeds are numerous, and of a roundish oblong figure.

MITHRIDATE, in pharmacy, a compound medicine in form of an electuary, serving either as a remedy or preservative against poisons; being also accounted a cordial, opiate, sudorific, and alexipharmic.

Mithridate is one of the capital medicines in the apothecaries-shops; the preparation of it, according to the direction of the college, is as follows: take of cinnamon, fourteen drams; of myrrh, eleven drams; agaric, spikenard, ginger, saffron, seeds of treacle-mustard, frankincense, chio-turpentine, of each ten drams; camels-hay, costus, indian leaf, french lavender, long pepper, seeds of hartwort, juice of the rape of cistus, strained storax, opopanax, strained galbanum, balsam of Gilead, or in its stead expressed oil of nutmegs, russia-castor, of each an ounce; poley-mountain, water-germander, the fruit of the balsam-tree, seeds of the carrat of Crete, bdellium strained, of each seven drams; celtic nard, gentian-root, leaves of dittany of Crete, red roses, seed of macedonian parsley, the lesser cardamom-seeds freed from

from their husks, sweet fennel seeds, gum arabic, opium strained, of each five drams; root of the sweet flag, root of wild valerian, anniseed, sagapenum strained, of each three drams; spignel, St. John's wort, juice of acacia, the bellies of skinks, of each two drams and a half; of clarified honey, thrice the weight of all the rest; dissolve the opium first in a little wine, and then mix it with the honey made hot. In the mean time melt together in another vessel the galbanum, storax, turpentine, and the balsam of Gilead, or the expressed oil of nutmeg, continually stirring them round that they may not burn; and as soon as these are melted, add to them the hot honey, first by spoonfuls, and afterwards more freely; lastly, when this mixture is near cold, add by degrees the rest of the species reduced to powder.

MITRALES VALVULÆ, mitral valves, in anatomy, two valves situated in the left ventricle of the heart, at the ingress of the pulmonary vein, serving to hinder the ingress and regress of the blood from the heart into the veins again, while they are constricted. See **HEART**.

MITRE, a sacredotal ornament worn on the head by bishops, and certain abbots on solemn occasions; being a sort of cap, pointed, and cleft at top. The high-priest among the Jews wore a mitre or bonnet on his head. The inferior priests among the Jews had likewise their mitres, but in what respect they differed from that of the high priest is uncertain. Some contend that the antient bishops wore mitres, but this is by no means certain. Those young women among the primitive christians, who professed a state of virginity, and were solemnly consecrated thereto, wore a purple and golden mitre, as a badge of distinction. His holiness the pope has no less than four different mitres, which are more or less rich, according to the solemnities of the festivals on which they are worn. The cardinals antiently wore mitres; some canons of cathedrals, in popish countries, have the privilege of wearing the mitre; and some great families in Germany bear it for their crest.

MITRE-SHELL, the smooth and slender buccinum, with a split rostrum. See the article **BUCCINUM**.

MITREOLA, in botany, a plant of the pentandria-digynia class, the flower of which consists of a single campanulated petal, divided into five segments at the

limb: the fruit is an erect simple bilocular capsule, containing numerous small and roundish seeds.

MITTAU, the capital of the dutchy of Courland, in Poland: situated in east long. 24°, north lat. 56° 40'.

MITTENDO MANUSCRIPTUM PEDIS FINIS, in law, an antient judicial writ, directed to the treasurer and chamberlain of the exchequer, requiring them to search for and transmit the foot of a fine, acknowledged before the justices in eyre into the common pleas, &c.

MITTIMUS, as generally used, hath two significations. 1. It signifies a writ for removing and transferring of records from one court to another. 2. It signifies a precept, or command in writing under the hand and seal of a justice of the peace, directed to the gaoler or keeper of some prison, for the receiving and safe-keeping of an offender charged with any crime until he be delivered by due course of law.

MIXT, or **MIXT BODY**, in philosophy and chemistry, that which is compounded of different elements or principles; in which sense it stands contradistinguished from simple or elementary, which is applied to bodies consisting of one principle only, as the chemists take sulphur, salt, &c. to do. The business of chemistry is, to resolve mixt bodies into their principles, or component parts.

MIXT ACTION, in law, is an action partly real, and partly personal, which lies both for the thing detained, and against the person of the detainer. See **ACTION**.

MIXTURE, a compound, or assemblage of several different bodies in the same mass. Dr. Shaw observes, that the mixtures, resolutions, and compositions made by chemistry, are extremely numerous, and may be increased ad infinitum. By mixture, says he, we produce all the artificial vitriols, soaps, glasses, &c. and can compound these again in an almost infinite variety. So that of the resolutions, mixtures, compositions, and recompositions in chemistry, there seems to be no bounds; whence great room is left, for the making of new chemical discoveries. Dr. Pemberton justly censures the irregular and inartificial mixtures used in pharmacy, and observes, that they were introduced by the ignorance of the first ages, and enforced by the perpetual fear and jealousies of poisons, against which the antients endlessly busied themselves in the search of antidotes, vainly hoping

to frame compositions that might singly prevail against every species of poison; hence they amassed together whatever they imagined to be endued with alexipharmic powers. By this procedure the simplicity of physic was lost, and a wantonness in mixing, enlarging, and accumulating took place, which has continued even to our times. The great Mr. Boyle has largely considered this subject, and among other arguments, says, it is reasonable to suspect, that where a great many ingredients are blended into a single medicine, one or other of them may have different operations from those designed by the physician; and, by awakening some sleeping ferment, produce a new distemper, or excite and actuate some other hostile matter, that before lay quiet, and which would have been gradually subdued by nature, had it not been unseasonably roused, and assisted by some ingredient, that perhaps was without any reason added to the medicine. See MEDICINE.

MIXTURA SIMPLEX, a medicinal preparation, made in the following manner: Take of the spiritus theriacalis camphoratus of Bates, ten ounces; spirit of vitriol, two ounces; rectified spirit of tartar, six ounces. Digest in a glass-vessel, hermetically sealed, for three weeks. This medicine excites sweat, resists putrefaction, and is good in malignant fevers. The dose is about a dram.

MIZEN, in the sea-language, is a particular mast or sail. The mizen-mast stands in the sternmost part of the ship. In some great ships there are two of these; when that next the main-mast is called the main-mizen, and that next the poop, the bonaventure-mizen. The length of the mizen-mast, is, by some, accounted the same with the height of the main-top-mast from the quarter-deck; or half the length of the main-mast, and half as thick. The sail which belongs to the mizen-mast, is called the mizen-sail; and when the word mizen is used at sea, it always means the sail. The use of the mizen is to keep the ship close to the wind, or when a ship rides at anchor, to back her a-stern, so that she may not foul her anchor, on the turning of the tide. The term mizen is used in the following phrases: set the mizen, that is, fit the mizen-sail right as it should stand. Change the mizen, or bring the mizen-yard over to the other side of the mast,

Peak the mizen, or put the mizen-yard right up and down by the mast. Spell the mizen, or let go the sheet and peak it up.

MNEMONIC, something relating to memory. See the article MEMORY.

MNIUM, in botany, a genus of mosses, consisting of stalks furnished with leaves, and producing capsules raised on pedicles, like those of the other mosses of this class; but besides these, there are other pedicles, bearing a kind of naked heads, with a dusty surface, and having no calyptræ. These two kinds of heads are, in some species, produced on the same plant; and in others, on different plants of the same species. The pedicles that support the capsules are long, and naked; whereas those supporting the dusty heads are short, and in some species furnished with short leaves. See plate CLXXX. fig. 3.

MOAR-LOVRE, in husbandry, a sort of blight, which happens mostly on light land, from the earth's sinking away from the roots, so that the plants fall down to the earth.

To remedy this, they turn a shallow furrow against the rows, when they are strong enough to bear it, and when the mould is fine and dry, for then the motion of the stalks by the wind will cause such earth to run through the rows, and settle about the roots, and cover them.

MOARING, or **MOORING**, in the sea-language, See the article MOORING.

MOAT, or **DITCH**, in fortification, a deep trench dug round the rampart of a fortified place, to prevent surprizes.

The brink of the moat, next the rampart, is called the scarpe; and the opposite one, the counterscarpe.

A dry moat round a large place, with a strong garrison, is preferable to one full of water; because the passage may be disputed inch by inch, and the besiegers when lodged in it, are continually exposed to the bombs, granades, and other fire-works, which are thrown incessantly from the rampart into their works. In the middle of dry moats, there is sometimes another small one, called cunette; which is generally dug so deep, till they find water to fill it.

The deepest and broadest moats are accounted the best, but a deep one is preferable to a broad one: the ordinary breadth is about twenty fathoms, and the depth about sixteen.

To drain a moat that is full of water, they

they dig a trench deeper than the level of the water, to let it run off; and then throw hurdles upon the mud and slime, covering them with earth or bundles of rushes, to make a sure and firm passage.

MOBILE, or **PRIMUM MOBILE**, the ninth sphere in the ptolemaic system of astronomy. See the article **PTOLEMAIC**.

Perpetual MOBILE, or **MOVEMENT**. See the article **MOVEMENT**.

MOBILIA, in law, the same with moveables. See **MOVEABLE GOODS**.

MOCO, or **MOCHO**, a great city and port-town of Arabia Felix, situated near the straits of Babelmandel, at the entrance of the Red-Sea: east long. 45° , north lat 13° .

MODAL PROPOSITIONS, in logic, such as include certain restrictions. See the article **PROPOSITION**.

MODBURY, a market-town of Devonshire, 32 miles south-west of Exeter.

MODE, *modus*, in philosophy, denotes the manner of a thing's existence, which is twofold, *viz.* simple or mixed.

Simple modes are only combinations of the same simple idea: thus by adding units together, in distinct separate collections, we come by all the several modes of numbers, as a *dozen*, a *score*, a *thousand*, &c. Mixed modes, on the contrary, are compounded of simple ideas of different kinds, as *beauty*, which consists in a certain composition of colour and figure, causing delight in the beholder: such also is *theft*, which is the concealed change of the possession of a thing, without the consent of the proprietor.

Concerning simple modes, Mr. Locke observes, that they are as perfectly different and distinct ideas in the mind, as those of the greatest distance and contrariety; thus *two* is as distinct from *three*, as blueness from heat.

To the head of simple modes, the same great philosopher refers space and extension, duration, and its simple modes, numbers, infinity, &c. also thinking, motion, sound, colour, pleasure, pain, &c. See **SPACE**, **DURATION**, &c.

There are three ways, he observes, whereby we get the complex ideas of mixed modes. 1. By experience and observation of things themselves: thus, by seeing two men wrestle, or box, we get the ideas of wrestling or boxing. 2. By invention, or voluntarily putting together of several simple ideas in the mind: thus, he that first invented print-

ing, must have had an idea of it in his mind before it ever existed; for the mind being once furnished with simple ideas, can put them together in several compositions, without examining whether they exist so together in nature: and hence it is, that such ideas are called notions, as if they existed more in the minds of men than in the reality of things; and to form them, the mind only joins their several parts, without considering whether they have any real existence. 3. By explaining the names of actions we never saw, or notions which we cannot see; and by enumerating all the ideas that go to make them up: thus the mixed mode, which the word *lie* stands for, is made up of these simple ideas; articulate sounds; certain ideas in the mind of the speaker; those words, the signs of these ideas; those signs put together by affirmation or negation, otherwise than the ideas they stand for are in the mind of the speaker.

Mixed modes have their unity from an act of the mind, combining those several simple ideas together, and considering them as only one complex idea; and the mark of this union is one name given to that combination, whereby men endeavour to communicate their thoughts to one another with all possible dispatch: and hence appears the reason why there are words in every language, which cannot be rendered by any single word of another; because the fashions and customs of one nation make several combinations, which another nation had never any occasion to make; as the ostracism, *ostrakismos*, among the Greeks; and proscription, among the Romans. This also occasions the constant change of languages; because the change of customs and opinions brings with it new combinations of ideas, which, to avoid long descriptions, have new names annexed to them. See **WORD**, **LANGUAGE**, &c. Actions being the business of mankind, it is no wonder that their several modes should be treasured up in the memory, and have distinct names assigned them, derived from their causes, means, objects, ends, instruments, time, place, and other circumstances. The powers too, fitted for these actions, form likewise distinct modes: thus boldness is the power to do or speak what we intend, without fear or disorder.

The efficacy whereby the new idea is produced, is called, in the subject ex-
erting

erting that power, action; but in the subject wherein any simple idea is changed or produced, passion; which efficacy, in intellectual agents, can be nothing but modes of thinking and willing; and in corporeal agents, nothing but modifications of motion. Of any other sort of action, we have no notion or idea; and therefore, many words, which seem to express some action, signify only the effect, with some circumstances of the subject wrought on, or cause operating. Thus creation, annihilation, &c. contain in them no idea of the action or manner, whereby they are produced; but barely of the cause, and the thing produced. In the same manner, when an ignorant person says that the cold freezes water, though the word freezing seem to import some action, yet it truly signifies nothing but the effect, viz. that the water, which was before fluid, is become hard and consistent, without containing any idea of the action whereby it is done.

There are numerous other divisions of modes, into immediate and mediate; essential and non-essential; positive and privative; of spirit and body; of thinking, &c.

Immediate MODES, are those immediately attributed to their subjects, as motion in a body, knowledge, &c.

Mediate MODES, are those attributed to subjects by the intervention of some other mode, as swiftness and slowness, which are attributable to a body, only in respect of motion.

Essential, or inseparable MODES, are attributes without which the substance cannot subsist, as wisdom, &c. in God, &c.

Non-essential, or separable MODES, are attributes affecting created substances, and affixed thereto as long as is necessary, as coldness in water, &c.

Positive MODES, are those which give something positive to their substance, as roundness in a globe.

Privative MODES, are attributed to subjects, when the mind, perceiving something wanting therein, frames a word which at first sight seems to note something positive, but in reality denotes the want of some mode.

MODES of spirit are two, knowledge and willing.

MODES of body are three, figure, rest, and motion.

MODE, or MOOD of syllogisms, among logicians. See SYLLOGISM.

MODE, in music, is defined to be a particular manner of constituting the octave; or, it is the melodious constitution of the octave, as it consists of seven essential sounds, besides the key or fundamental. See the article OCTAVE.

A mode, then, is the particular order of the concinnous degrees of an octave; the fundamental note whereof may be called the key, as it signifies that principal note which regulates the rest.

The proper difference, therefore, between a mode and a key is this, that an octave, with all its natural and concinnous degrees, is called a mode, with respect to the constitution or manner of dividing it; and, with respect to its place in the scale, it is called a key. Now it may be farther observed, that, of the natural notes of every mode, three go under the name of the essential notes, namely, the fundamental, the third and fifth; their octaves being reckoned the same, and marked with the same letters in the scale; the rest are called dependents. Again, the fundamental is also called the final, the fifth the dominante; and the third, as being between the other two, the mediant.

The doctrine of the antients, with regard to modes, is somewhat obscure.

Music was considerably improved in the eleventh century by Guido Aretinus, who, among other innovations, reformed the doctrine of modes. It is true, their number was fixed to seven; but afterwards considering the harmonical and arithmetical divisions of the octave, whereby it resolves into a fourth above a fifth, or a fifth above a fourth, they hence constituted twelve modes, making of each octave two different modes; but, because there are two of them that cannot be divided both ways, there are but twelve modes. Of these such as were divided harmonically, that is, with the fifths lowest, which were six, were called authentic; and the other six, which had the fifths highest, were called plagal modes.

Plagal Octave. Authentic Octave.

| | | | | | |
|---------|--------|---------|--|--|--|
| | | | | | |
| Fourth. | Fifth. | Fourth. | | | |
| | | | | | |
| g—c | g—c | g—c | | | |
| a—d | a—d | a—d | | | |
| b—e | b—e | b—e | | | |
| c—f | c—f | c—f | | | |
| d—g | d—g | d—g | | | |
| e—a | e—a | e—a | | | |

To these modes they gave the names of the antient greek towns, as Dorian, Phrygian, Lydian. But the several authors differ in the application and order of these names; so that we are still at a loss, what their real use was.

All we know is, they considered that an octave which wants a fourth or fifth is imperfect; these being the concords next to the octave, the song ought to touch those chords most frequently; and because the concord is different, which makes the melody different, they established by this two modes in every natural octave that had a true fourth or fifth: Then, if the song was carried as far as this octave above, it was called a perfect mode; if less, as to the fourth or fifth, it was called imperfect; if it moved both above and below, it was called a mixed mode. Others considering how indispensable a chord the fifth is in every mode, took for the key-note, in the arithmetically divided octaves, not the lowest chord of that octave, but that very fourth. The only difference then in this method between the authentic and plagal modes is, that the authentic goes above its final to the octave; the other ascends a fifth, and descends a fourth: which will indeed be attended with different effects, but the mode is essentially the same, having the same final to which all the notes refer.

The modes of authentic or plagal differ among themselves, either by standing higher or lower in the scale, that is, by the different tension of the whole octave, or rather by the different subdivision of the octave into its concinnous degrees.

That one mode should produce mirth, another sadness, and that a third should be proper for religion, a fourth for love, &c. that these effects are owing merely to the constitution of the octave, scarce any body will affirm. The differences in the constitution will, it is true, have some little influence; the greatest difference is that of those octaves which have the 3d *f*, or 3d *g*, making what on other occasions we call the sharp and flat key. It is particularly observable that those who give us examples in actual composition of their twelve modes, frequently take in the artificial notes *♯* and *♭* to perfect the melody of their key, and by this means depart from the constitution of the octave, as it stands fixed in the natural system. Therefore, the modes are all really reducible to two, *viz.* the

sharp and flat; the other differences respecting only the place of the scale, where the fundamental is taken.

Originally, there were but three antient modes, namely, the Doric, Lydian, and Phrygian, which were particularly called tones, as being at a tone's distance from each other: the rest were afterwards added, and denominated from the relation they bore to the former, particularly the Hypodoric, as being below the Doric. Besides these modes of tune, there were modes of time, at first distinguished into greater and lesser; and each of these again into perfect and imperfect. But afterwards they were reduced to four, which are now disused.

The common mode now in use is much more simple than any of those; the proportion, which in theirs is varied, being in ours fixed, namely, 2 : 1. A large is equal to 2 longs, a long to two breves, a breve to 2 semi-breves, &c. And, if on some occasions, the proportion of 3 : 1 betwixt two successive notes is required, it is easily expressed by annexing a point, thus (.) See the articles TIME, CHARACTER, &c.

The antients had also their *modi melopœi*, as dithyrambic, comic, and tragic; so called from their expressing the several affections of the mind.

MODEL, in a general sense, an original pattern, proposed for any one to copy or imitate.

This word is particularly used, in building, for an artificial pattern made in wood, stone, plaster, or other matter, with all its parts and proportions, in order for the better conducting and executing some great work, and to give an idea of the effect it will have in large. In all great buildings, it is much the surest way to make a model in relieve, and not to trust to a bare design or draught. There are also models for the building of ships, &c. and for extraordinary stair-cases, &c.

They also use models, in painting and sculpture, whence, in the academies, they give the term model to a naked man or woman, disposed in several postures to give an opportunity to the scholars to design him in various views and attitudes.

MODENA, a dutchy of Italy, bounded by Mantua on the north, by Romania on the east, by Tuscany and Lucca on the south, and by Parma and the territory of Genoa on the west.

MODENA, the capital of the dutchy of that name,

name, situated in $11^{\circ} 20'$ east long. and $44^{\circ} 45'$ north lat.

MODERATA MISERICORDIA, in law, a writ that lies where one is amerced in a court baron, or other court, not being of record, for any fault or transgression beyond the quality and quantity of that offence; and is directed to the lord of the court or his steward, commanding them to take a moderate amercement of the party.

MODERATOR, in the schools, the person who presides at a dispute, or in a public assembly: thus the president of the annual assembly of the church of Scotland, is stiled moderator.

MODERATOR-RING, in anatomy, is used by Valsalva for that ring which the muscles of the eye make round the optic nerve at the bottom of the orbit.

MODERN, in a general sense, something new, or of our time, in opposition to what is antique or antient.

MODICA, a town of Sicily, in the province of Noto, twenty-five miles south of Syracuse.

MODIFICATION, in philosophy, that which modifies a thing, or gives it this or that manner of being.

Quantity and quality are accidents which modify all bodies. According to Spinoza's system all the beings that compose the universe are only so many different modifications of one and the same substance; and it is the different arrangement, and situation of their parts, that make all the difference between them.

MODILLIONS, in architecture, ornaments in the cornice of the ionic, corinthian, and composite columns. See

IONIC, CORINTHIAN and **COMPOSITE**. The modillions are little inverted consoles, or brackets, in form of an S under the soffit of the cornice, seeming to support the projecture of the larmier; tho' in reality they are no more than ornaments. See plate CLXXXI. fig. 3.

They ought always to be placed over the middle of the column. They are particularly affected in the corinthian order, where they are usually enriched with sculpture. Their proportions ought to be so adjusted, as to produce a regularity in the parts of the soffits. The intermodillions, *i. e.* the distances between them, depend on the inner columns, which oblige the modillions to be made of a certain length and breadth, in order to render the intervals perfect squares, which are always found to have better effects

than parallelograms. To this it must be added, that in adjusting the modillions, care should be taken that they have such a proportion as that when the orders are placed over one another, there be the same number in the upper order as in the lower, and that they fall perpendicularly over one another.

Modillions are also used under the corniches of pediments, though Vitruvius observes that they were not allowed in his time, because modillions were intended to represent the ends of rafters. Daviler rather takes them for a kind of inverted consoles, or corbels. The modillion is sometimes called a mutule, though custom has introduced a little difference between the idea of a modillion and a mutule; the mutule being peculiar to the doric order, and the modillions to the higher orders. In the ionic and composite orders, modillions are more simple, having seldom any ornaments except sometimes a single leaf underneath. M. Le Clerc observes on the corinthian order, that it is usual to have a leaf that takes up their whole breadth, and almost their whole length too; but he is of opinion, that the modillions would be more graceful, if this leaf was less both in length and breadth.

MODIOLUS, in surgery, an instrument otherwise called a trepan. See the article **TREPAN**.

MODIUS, in antiquity, a kind of dry measure, in use among the Romans, for several sorts of grain. See **MEASURE**.

MODO ET FORMA, in manner and form, among lawyers, are words of art frequently used in pleadings, &c. and particularly in a defendant's answer, wherein he denies to have done what is laid to his charge in manner and form, as affirmed by the plaintiff.

MODON, a city and port-town of european Turkey, situated in the Morea, twenty miles west of Coron: east long. $21^{\circ} 30'$, north lat. 37° .

MODULATION, in music, the art of keeping in, or changing the mode or key. See the articles **KEY** and **MODE**.

Under this term is comprehended, the regular progression of several parts, thro' the sounds that are in the harmony of any particular key, as well as the proceeding naturally and regularly from one key to another; the rules of modulation, in the first sense, belonging to harmony and melody. See the articles **HARMONY** and **MELODY**.

We shall here only add a few words with regard to the rules of modulation, in the latter sense. As every piece must have a particular key, and since the variety so necessary in music to please and entertain forbids the being confined to one key, and that therefore it is not only allowable but necessary to modulate into, and make cadences on several keys having a relation and connection with the principal key, it must be considered what it is that constitutes a connection between the harmony of one key and that of another; that it may be hence determined into what keys the harmony may be conducted with propriety.

As to the manner in which modulation from one key to another is performed, so that the transition may be easy and natural, it is not easy to fix any precise rules; for though it is chiefly performed by the help of the seventh greater of the key, into which the harmony is to be changed, whether it be sharp or flat, yet the manner of doing it is so various and extensive, as no rules can circumscribe. A general notion of it may be conceived under the following terms: the seventh greater in either a sharp or flat key, is the third greater to the fifth of the key by which the cadence is chiefly performed, and by being only a semitone major below the key, is thereby the most proper note to lead into it, which it does in the most natural manner imaginable, in so much that the seventh greater is never heard in any of the parts, but the ear expects the key should succeed it: for whether it be used as a third or a sixth, it always affects us with so imperfect a sensation, that we naturally expect something more perfect to follow it, which cannot be more easily and smoothly accomplished than by the small interval of a semitone major to pass into the perfect harmony of the key. Hence it is that the transition into any key is best effected by introducing its seventh greater, which so naturally leads to it.

MODULE, in architecture, a certain measure or bigness, taken at pleasure, for regulating the proportions of columns, and the symmetry or disposition of the whole building. Architects generally choose the semi-diameter of the bottom of the column for their module, and this they sub-divide into parts or minutes. The module of Vignola, which is a semi-diameter, is divided into twelve parts in the tuscan and doric, and into eighteen

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for the other orders. The module of Palladio, Scamozzi, M. Cambray, Desgodetz, Le Clerc, &c. which is also equal to the semi-diameter, is divided into thirty parts or minutes in all the orders. The whole height of the column is divided by some into twenty parts for the doric, twenty-two and a half for the ionic, twenty-five for the roman, &c. and one of these parts is made a module, to regulate the rest of the building by.

There are two ways of determining the measures, or proportions of buildings. The first is by a fixt standard-measure, which is usually the diameter of the lower part of the column, called a module, sub-divided into sixty parts called minutes. In the second there are no minutes, nor any certain or stated division of the module, but it is divided occasionally into as many parts as are judged necessary; thus the height of the attic base, which is half the module, is divided either into three, to have the height of the plinth, or into four, for that of the greater torus; or into six, for that of the lesser. Both these manners have been practised by the antient as well as the modern architects, but the second, which was that chiefly used among the antients, is, in the opinion of M. Perrault, the preferable. As Vitruvius has lessened his module in the doric order, which is the diameter of the lower part of the other orders, and has reduced that great module to a mean one, which is the semi-diameter, the module is here reduced to the third part, for the same reason, *viz.* to determine the several measures without a fraction. For in the doric order, besides that the height of the base, as in the other orders, is determined by one of those mean modules, the same module gives likewise the height of the capital, architrave, triglyphs, and metopes. But our little module, taken from the third of the diameter of the lower part of the column, has uses much more extensive; for by this the height of the pedestals or columns and entablatures in all the orders are determined without a fraction. As then the great module or diameter of the column has sixty minutes, and the mean module, or half the diameter, thirty minutes, our little module has twenty.

MODUS DECIMANDI, in law, is where money, land, or other valuable consideration has been given, time out of mind, to the minister or parson of any certain place in the room of tithes. A clergy-

man may sue in a spiritual court for a *modus decimandi*; yet if the *modus* is denied there, or a custom is to be tried, the trial thereof belongs to the courts of common law. When lands are converted to other uses, as in the case of hay-ground turned into tillage, the *modus* may be discharged, and the tithes paid again in kind.

MOEDORE, or MOIDORE. See the article **MOIDORE**.

MOHERINGIA, MOSSY CHICKWEED, in botany, a genus of the octandria-digynia class of plants, the flower of which is composed of four short, undivided petals; and its fruit is a subglobose capsule, with one cell, in which are contained numerous roundish seeds.

It is called by some *asine muscosa*.

MOFFAT, a village in the shire of Annandale, thirty-six miles south-west of Edinburgh; famous for its mineral wells, one of which is used for bathing, and the water of the other is taken inwardly. These waters are of great service in gripings of the guts, colics, and pains in the stomach. Those who are troubled with obstructions, rheumatic pains and aches, find great relief both from bathing and drinking; nor is this water a less sovereign remedy in scorbutic cases, and the king's evil. These wells, in the opinion of Dr. Plummer, professor of medicine in the university of Edinburgh, owe their virtues to a sulphureous principle.

MOGULS, or MONGULS, hoards or tribes of vagrant Tartars, on the north of India, from whom the moguls or sovereigns of India, as well as of the Uzbek-Tartars, are descended.

MOHAIR. in commerce, the hair of a kind of goat, frequent about Angoura, in Turkey; the inhabitants of which city are all employed in the manufacture of camblets, made of this hair. See the articles **HAIR** and **CAMBLET**.

Some give the name mohair to the camblets or stuffs made of this hair; whereof the unwatered kind pays $6\frac{23}{100}$ d. per yard on importation, and draws back, on exportation, $6\frac{7\frac{1}{2}}{100}$ d. The watered sort

pays on importation $11\frac{55}{100}$ d. per yard, and draws back, on exportation, $10\frac{12\frac{1}{2}}{100}$ d.

And that made of half hair, half silk, pays, on importation, 2 s. $10\frac{35}{100}$ d. per yard, and draws back, on exportation, 2 s. $7\frac{1}{2}$ d.

MOHAIR-SHELL, in natural history, a species of voluta. See **VOLUTA**.

MOHATS, a town of Lower Hungary, situated on the Danube: east long. 20° , north lat. $46^{\circ} 16'$.

MOHAWK-COUNTRY, a part of North America, inhabited by one of the five nations of the Iroquois, in alliance with and situated between the province of New York and the lake Ontario, or Frontignac.

MOHILA, one of the Comora-islands in the Indian ocean, situated between Madagascar and the continent of Africa: east long. $43^{\circ} 30'$, south lat. 12° .

MOHILOW, or MOGILOF, a city of Poland, in the province of Lithuania, situated fifty miles south of Orsa.

MOIDORE, or MOEDORE, a portuguese gold-coin. See the article **COIN**.

MOIETY, medietas, the half of any thing. See the article **MEDIETAS**.

MOINEAU, in fortification, is a flat bastion raised between two other bastions, when a re-entering angle before a curtain is too long. The moineau is commonly joined to the curtain, but it is sometimes separated from it by a foss, in which case it is called a detached bastion. The moineau is not raised so high as the works of the place, because it ought to be exposed to the fire of the place in case the enemy should lodge themselves in it.

MOISTURE, a term sometimes used to denote animal fluids, the juices of plants, or dampness of the air or other bodies.

Radical Moisture, among physicians, signifies a vital fluid, which nourishes and maintains life, as oil does a lamp. However, Dr. Quincy observes, that such a fluid is a mere chimera, unless we thereby mean the mass of blood. See the article **BLOOD**.

MOLA, in geography, a town of Italy, seven miles east of the city of Barri, in the kingdom of Naples.

MOLA, in anatomy, the same with patella. See the article **PATELLA**.

MOLA, the **SUN-FISH,** in ichthyology, a species of ostracion, of a compressed, roundish figure, with four holes on the head.

This is a very singular fish, weighing often more than an hundred pounds: its figure, at first sight, more resembles the head of some large fish, cut off from the body, than that of a complete animal.

MOLA, a mole, in medicine. See the article **MOLE**.

MOLARES,

MOLARES, or **DENTES MOLARES**, in anatomy, the large teeth called in english grinders. See the article **TOOTH**.

MOLARIS LAPIS, the mill-stone. See the article **MILL-STONE**.

MOLASSES, or **MOLOSSES**. See the article **MOLOSSES**.

MOLD, or **MOULD**. See **MOULD**.

MOLDAVIA, a province of europezn Turkey, separated from Poland by the river Neister.

MOLE, *talpa*, in zoology, makes a genus of quadrupeds, of the order of the feræ, thus characterized: the feet are formed like hands, and calculated for digging; and it has no external ears.

Of this genus there are two species. 1. The common mole, a well known little animal, of a bluish-black colour, very mischievous to the farmers, by throwing up the ground of their pastures. 2. The pointed tail-less mole, somewhat larger than the common kind: it is of a mixed colour, in which a purplish and yellowish tinge seem the prevailing ones: it is a native of Asia, and lives under ground, like the common mole.

MOLE CRICKET, the same with *gryllo talpa*. See **GRYLLO TALPA**.

MOLE, *mola carnea*, in medicine, a mass of fleshy matter, of a spherical figure, generated in the uterus, or womb, and sometimes mistaken for a child. Its size is various, from that of a large nut to that of a foetus. Some moles are soft and spongy, and others membranous, with a cavity in the middle. Sometimes they are filled with serous matter, and sometimes with hydatides.

The symptoms of a mole, at first, are like those of a real pregnancy; but afterwards they vary, for the woman feels a dull heavy weight like that of a ball of lead; her belly being round and spherical, without any motion like that of a living foetus.

The mole itself threatens no danger, all the difficulty lying in being delivered of it. Some women are troubled with them for several years, and others all their life, without any other inconvenience than uneasiness and weight.

The cure consists in expelling the mole; for which purpose the assistance of an expert midwife or surgeon becomes necessary. If the mouth of the uterus should be too strongly contracted to admit the hand of the operator, it is proper to excite the woman's throws by brisk cathartics and strong clysters; while the

os uteri, and parts adjacent, are in the mean time gradually relaxed by the application of emollient fomentations, &c. which done, one or two of the fingers are to be first gently insinuated, and then the whole hand by degrees, in order to extract the mole, as directed for the foetus. See the article **DELIVERY**.

If the mole adheres to the uterus, as it frequently does, it is to be gently separated before extraction; and if it be too large to be got out entire, it may be carefully separated and extracted in pieces, either with the fingers, or a falciform hook. To conclude, says Heister, if a mole does not occasion any bad symptoms, or uneasiness in the mother, and its extraction appears difficult, no violence should be used; since we have many instances of moles retained in the uterus, without any great detriment to the patient, as long as they lived.

MOLE, in geography, a river in Surrey, so called from its running, for part of its course, under ground.

MOLE, *moles*, is also a massive work of large stones laid in the sea by means of cofferdams; extending before a port, either to defend the harbour from the impetuosity of the waves, or to prevent the passage of ships without leave.

MOLE, *moles*, in antiquity, a kind of mausoleum, in form of a round tower, built upon a square base.

MOLINA, a city of Spain, eighty five miles north-east of Madrid.

MOLINE, or **CROSS-MOULIN**, in heraldry, the same with that called *fer de moulin*. See the article **FER DE MOULIN**.

MOLISE, a city of Italy, fifty miles north-east of the city of Naples.

MOLLEN, a town of Lower Saxony, sixteen miles north of Lawenberg.

MOLLUGO, **EASTARD-MADDER**, in botany, a plant of the triandria-trigynia class, without any flower-petals: its fruit is a capsule of a somewhat oval figure, with three cells; in each of which there are a number of kidney-shaped seeds.

It is said to have the same medicinal virtues as madder. See **MADDER**.

MOLOSSES, in commerce, the thick fluid matter remaining after the sugar is made, resembling syrup. See **SUGAR**.

In Holland molasses are much used in the manufacture of tobacco, and by the poor people for sugar. A brandy is also distilled from them, but it is said to be unwholesome. See the articles **BRANDY**, **DISTILLATION**, &c.

Molosses imported from the british plantations, pay per ton 2 l. 11 s. 4 d. and draw back, on exportation, 2 l. 5 s. Molosses from any other place, pay, on importation, 10 l. 1 s. 4 d. per ton; and draw back, on exportation, 9 l. 15 s.

MOLOSSUS, in greek and latin poetry, a foot composed of three long syllables, as *delectant*.

MOLTA, or MOLTURA, a toll or duty formerly paid by vassals to their lord, for grinding their corn in his mill.

MOLTING, the change of feathers, hairs, or horns, in birds and beasts. See the article MEWING.

MOLUCCA-ISLANDS, five islands in the Indian ocean, the largest of which is scarce thirty miles round; they are called Bachian, Machian, Motyr, Ternate, and Tydor; they produce sago, oranges, lemons, and some other fruits; but what is peculiar to these islands, is their producing cloves. They are subject to the Dutch, and are situated in 125° of east longitude, and between $50'$ south, and 2° north latitude.

MOLUCCA-BEANS, *moluccella*, in botany, a genus of the didynamia-gymnospermia class of plants, the flower of which is monopetalous and labiated; the upper lip being entire, and the lower one trifid: the seeds are turbinated, and contained in the bottom of the cup.

MOLWITZ, a town of Silesia, in the kingdom of Bohemia: east long. $16^{\circ} 45'$, north lat. $50^{\circ} 26'$.

MOLY, in botany, a species of allium, or garlic.

MOLYBDIA, in natural history, the name of a genus of crystals, of a cubic form, or composed of six sides, at right angles, like a die. See CRYSTAL.

Of this genus there are three known species. 1. A colourless one, composed of extremely fine crusts. This is found in many parts, both of this and other kingdoms, where there are lead-mines; and tho' naturally colourless, is sometimes tinged with a red, green, or blue. 2. A dull one with thicker crusts, sometimes whitish, and sometimes coloured to a yellowish or other hue. This is found in the lead-mines of Yorkshire, and some other places. And 3. A dull bluish white one, with very thick crusts. This is very frequent in the lead-mines in Derbyshire, and is generally found in large clusters.

MOMBAZA, or MONBASA, an island and city on the east coast of Africa, op-

posite to the country of Mombaza, in Zanguebar: east long. 48° , north lat. 4° .

MOMBAZA, a sub-division of Zanguebar, subject to the Portuguese.

MOMENT, in the doctrine of time, an instant, or the most minute and indivisible part of duration. See TIME.

Strictly speaking, however, a moment ought not to be considered as any part of time, but only as the termination or limit thereof.

MOMENT, in the doctrine of infinites, denotes the same with infinitesimal. See the article INFINITESIMAL.

Leibnitz, and other foreigners, call these moments differences. See CALCULUS DIFFERENTIALIS.

MOMENTUM, in mechanics, signifies the same with impetus, or the quantity of motion in a moving body; which is always equal to the quantity of matter, multiplied into the velocity; or, which is the same thing, it may be considered as a rectangle under the quantity of matter and velocity. See MOTION.

MOMORDICA, the WILD CUCUMBER, in botany, a genus of the monoecia-syngenesia class of plants, with a monopetalous flower, divided into five segments; the fruit is an apple, bursting open with great elasticity, and containing a number of compressed seeds.

This genus comprehends the momordica and luffa of Tournefort, and the elaterium of Boerhaave; and indeed the elaterium of the shops, a violent purge, is the fruit of this plant.

MONA, an island in the Baltic, south-west of the island of Zealand, subject to Denmark: east long. $12^{\circ} 30'$, north lat. $55^{\circ} 20'$.

MONACO, a port-town of Italy, in the territory of Genoa: east long. $7^{\circ} 18'$, north lat. $43^{\circ} 53'$.

MONADELPHIA, in botany, a class of plants, the sixteenth in order, so called because the stamina of the flowers are so interwoven as to form one body; or rather, because the stamina are connected, or coalesce at the base. See BOTANY. To this class belong the mallow, alcea, althæa, and hibiscus. See the article MALLOW, &c.

MONAGHAN, a county of Ireland, in the province of Ulster, bounded by Tyrone, on the north; by Armagh, on the east; by Cavan and Louth, on the south; and by the county of Farmanagh, on the west.

MONANDRIA, in botany, a class of plants,

plants, the first in order, with only one stamen, or male part in each flower.

The monandria are subdivided into two orders, which are denominated monandria-monogynia, and monandria-digynia, according as they contain one or two styles. See the article *STYLE*.

To this class belong canna, boerhaavia, &c. See the article *CANNA*, &c.

MONARCHY, a government in which the supreme power is invested in a single person. There are several kinds of monarchies, as where the monarch is invested with an absolute power, and is accountable to none but God. It is an error to suppose, that a despotic or absolute monarch is a solecism in politics, and that there can be none such legally; for the contrary is true, and that in different parts of the world, and from various principles. In China it is founded on paternal authority, and is the basis of the government; in Turkey, Persia, Barbary, and India, it is the effect of religion; and in Denmark, the king is legally absolute by the solemn surrender which the people made to his predecessor of their liberties. Another kind of monarchy is that which is limited, where the supreme power is virtually in the laws, though the majesty of government, and the administration, is vested in a single person. Monarchies are also either hereditary, where the regal power descends immediately from the possessor to the next heir by blood; or elective, where the choice depends upon all who enjoy the benefit of freedom, as in Poland; or upon a few persons in whom the constitution vests the power of election, as in the german empire. See the articles *KING* and *GOVERNMENT*.

MONARDA, in botany, a genus of the diandria-monogynia class of plants, with a monopetalous flower, the limb of which is ringent: the seeds are four in number, roundish, and contained in the bottom of the cup.

MONASTERY, a convent, or house built for the reception and entertainment of monks, mendicant friars; or nuns, whether it be an abbey, priory, &c.

Monasteries are governed by different rules, according to the different regulations prescribed by their founders. The first regular and perfect monasteries were founded by St. Pachomius, in Egypt: but St. Basil is generally considered as the great father and patriarch of the eastern monks; since in the fourth cen-

tury he prescribed rules for the government of the monasteries, to which the anachorets and coenobites, and the other antient fathers of the desarts, submitted: in like manner St. Benedict was stiled the patriarch of the western monks; he appeared in Italy towards the latter end of the fifth century, and published his rule, which was universally received throughout the west. St. Augustin being sent into England by St. Gregory the pope, in the year 596, to convert the English, he at the same time introduced the monastic state into this kingdom, which made such progress here, that within the space of two hundred years, there were thirty kings and queens who preferred the religious habit to their crowns, and founded stately monasteries, where they ended their days in solitude and retirement.

MONASTIC, something belonging to monks. See the article *MONK*.

MONBRISON, or **MONTHRISON**, a town of France, in the province of Lyons, thirty-seven miles south-west of Lyons.

MONCON, a town of Spain, in the province of Arragon, fifty miles north-east of Saragossa.

MONCONTOUR, a town of France, in the province of Britany, thirty miles south-west of St. Malo.

MONDAY, *dies lunæ*, the second day of the week, so called as being antiently sacred to the moon, *q. d.* moon-day. See the articles *DAY* and *WEEK*.

MONDEGO, a river of Portugal, which runs through the province of Beira, and falls into the Atlantic ocean thirty miles below Coimbra.

MONDENEDO, a city of Spain, in the province of Galicia, seventy miles north-east of Compostella.

MONDIDIER, a town of France, in the province of Picardy, eighteen miles south of Amiens.

MONDOVI, a city of Italy, in the territory of Piedmont: east long. $7^{\circ} 55'$, north lat. $44^{\circ} 35'$.

MONEMUGI, a country in the south of Africa, situated between Angola and Zanguebar.

MONEY, *moneta*, a piece of matter, commonly metal, to which public authority has affixed a certain value and weight, to serve as a medium in commerce.

The æra of the invention of money is not easy to be settled. There is no room to doubt but that in the earliest ages the ordinary way of traffic among men, was by

by trucking or exchanging one commodity for another; but in course of time it was found necessary, in the way of commutative justice, to have some common measure or standard, according to which all things should be estimated. See the article EXCHANGE.

Money is usually divided into real and imaginary. Real money includes all coins, whether of gold, silver, copper, or the like; such as guineas, crowns, pistoles, pieces of eight, ducats, &c. for an account of which we refer the reader to the article COIN, where we have given tables of the most remarkable coins, both antient and modern, with their values in english money. See also GUINEA, CROWN, PISTOLE, &c.

Imaginary money, or money of account, is that which has never existed, or, at least, which does not exist in real species; but is a denomination invented or retained to facilitate the stating of accounts, by keeping them still on a fixed footing, not to be changed like current coins, which the authority of the sovereigns sometimes raises or lowers, according to the exigencies of the state, of which kinds are pounds, livres, marks, maravedies, &c. See POUND, &c.

Under this division of money we have endeavoured to give an account of all the most remarkable imaginary species in the several trading places of note in the world; and having made our collection from various authors, we have corrected their errors, which were many, with all possible accuracy. And here it is necessary to observe, that to avoid repetitions, we are obliged to refer the reader to the article COIN, for the stating the proportion of the different european monies of account to sterling money; some of this last species of most nations in Europe being given there, with its value in english money, which may serve to settle the several proportions with the English.

English MONEY of account, is the pound, shilling, and pence; the first and last being imaginary money, and exchanges calculated in one of them two: the pound contains twenty shillings, and the shilling twelve pence.

Scotch MONEY of account, is the pound, shilling, and penny; the pound containing twenty shillings, being equivalent to one shilling and eight pence english; and the shilling containing twelve pennies, equal to a penny english. There

is also among them an account of marks, the mark being equivalent to one shilling $1\frac{1}{2}$ penny english: of this last kind they had formerly a silver coin. See COIN.

French MONEY of account, is in livres, sols, and deniers, of which twelve deniers make a sol, and twenty sols a livre: their exchange is by the crown of three livres, or sixty sols.

Dutch MONEY of account, is kept, at Amsterdam and Rotterdam, the two chief trading places, in guilders, stivers, and penins; so that though goods are sold for other species, such as livre-de-gros, &c. yet all are reduced to the above denominations for the entries into their books. The exchanges are made with us in so many shillings to a pound sterling, though in most other places in deniers-de-gros.

Spanish MONEY of account, is at Cadiz kept in rials of plate and its fractions; at Castile, in maravedies; at Valencia, in livres or dollars, sueldos and dineros; of which last, twelve make a sueldo, and twenty sueldos a livre or dollar. Seventeen quartos at Cadiz and Castile make two rials vellon, which is now an imaginary coin, though formerly it was the principal one of the kingdom. A maravedie is another imaginary specie, of which seventeen is reckoned to a rial vellon. The ducat is also a fictitious coin of eleven rials of plate in purchases, sales, and other mercantile transactions, except in exchanges, when it is valued at eleven rials of plate, and one maravedie, or 375 maravedies.

Portuguese MONEY of account, is kept in reas, or res, making a separation at every hundred, thousandth, &c. 800 reas go to a moidore.

German and Swiss MONEY of account. At Coningsberg, Elbing, and Dantzick, accounts are kept in rixdollars and gros, or in polish guilders, gros, and deniers, or penins. They exchange on Amsterdam in polish gros for a livre-de-gros of six guilders current money of Amsterdam, and on Hamburg for the rixdollar. At Lubeck, accounts are kept in marks, schellings, and deniers or penins-lubs, in which their exchanges are made. At Breslaw, accounts are kept in rixdollars and silver gros and penins; in the first of which species exchanges are made on Amsterdam for a certain number of silvers, bank-money, and on Hamburg for rixdollars of Breslaw, against rixdollars of Hamburg bank. At Hamburg, accounts

counts are kept in marks, schellings, and deniers-lubs bank-money, by those who have cash in the bank; but by those who have not, their books are generally kept in rixdollars, schellings, and denier current money. At Bremen, accounts are kept in rixdollars and gros, and it exchanges on Amsterdam rixdollars of seventy-two gros, for rixdollars of fifty flivers banco. At Leipzig and Naumbourg, accounts are kept in rixdollars, crowns, gros, and penins. At Berlin, and in all this kingdom, accounts are kept in guilders, gros, and penins. At Zurich, accounts are kept in rixdollars, creutzers, and hellers; reckoning their rixdollars (worth about 4 s. 6 d. sterling) at 108 of their creutzers. At Frankfort on the Maine, and Hanaw, accounts are kept in rixdollars and creutzers. At Vienna accounts are kept in guilders, creutzers, and penins, reckoning eight penins to a creutzer, and sixty creutzers to a guilder. At Nuremberg and Augsbουργ, accounts are kept in guilders, creutzers, and hellers; at Liege, in livres, sols, and deniers.

In the canton of St. Gall, in Switzerland, accounts are kept in guilders, creutzers, and penins; or under the same denomination with the coins of the empire. In the canton of Basil, accounts are variously kept, some in rixdollars, schellings, and deniers; some in livres, schellings, and deniers; some in rixdollars, creutzers, and penins; and some in guilders, creutzers, and penins.

Italian MONEY of account. In the cities of Genoa and Novi, accounts are kept in livres, soldi, and denari; or in dollars of 100 soldis. At Milan accounts are kept in livres, soldis, and denari, to be counted like pounds, shillings, and pence, viz. twelve denaris to a soldi, &c. At Rome, accounts are kept in crowns, julios, and bajoches, or grains and quartrins; the crown is divided into ten julios, and the julio into ten bajoches. At Leghorn, accounts are generally kept in dollars, soldi, and denari. At Florence, they keep their books and accounts in crowns, soldi, and denari, picoli or current money. At Naples, accounts are kept in ducats, florins, and grains. The accounts in Sicily are kept the same as at Naples. At Lucca they keep their accounts in crowns, livres, soldi, and denari; the crown is worth 7 livres 10 soldi; the livre, 20 soldi; and the soldi, 12 denari. At Venice, accounts

are kept in livres, soldi, and denari, picoli, or current; but the bank-entries are in livres, soldi, and grosses: both the current and bank-ducats of Venice make 24 soldi, or 6 livres and four soldi. At Bologna, accounts are kept in livres, soldi, and denari; the livre being 20 soldi, and the soldi 12 denari. At Bergam, the money of account is the same as at Bologna, and its proportions the same. At Parma accounts are kept in crowns, soldi, and denari; the crown is 20 soldi, and the soldi 20 denari. At Modena and Mantua, accounts are kept in livres, soldi, and denari. In Savoy and Piedmont, accounts are kept in livres or lires, soldi, and quartrins. At Placentia, accounts are kept in crowns, soldi, and denari of mark; of which 12 denari make a soldi, and 20 soldi the crown. In the island of Sardinia, accounts are kept as in most parts of Italy, in livres, soldi, and denari. In the island of Malta, the money of account is the same with that of Sicily. In the island of Candia, the account is the same as at Venice.

Russian, Swedish, Danish, and Polish, MONEY of account. In the trading places of the russian empire, accounts are kept in roubles, grives, and moscosques, or in roubles and coppecks; 10 coppecks (each of which is equal to 2 moscosques) make a grive, and 100 coppecks, or 10 grives, is a rouble. In the kingdom of Sweden, accounts are kept in dollars, marks, and oorts; the dollar being worth 4 marks, and the mark 8 oorts. In Denmark, accounts are kept in marks and schellings: the rixdollar is worth six marks; the mark, 16 schellings; and the schelling, 3 penins. Accounts are kept at Bergen, and in other places in Norway, in danish rixdollars, marks, and schellings. In Poland, accounts are kept in guilders, gros, and deniers, of which 18 deniers make a gros, and 30 gros a guilder: they here keep accounts also in rixdollars and gros, reckoning 90 of the latter to one of the former. At Riga, accounts are kept in rixdollars and gros, the former of which species consists of 90 of the latter.

Turkish MONEY of account. The Turks, both in Europe, Asia, and Africa, account by purses, either of silver or gold (the last being only used in the seraglio) with half purses of gold, called also rizes: the purse of silver is equal to 1500 french livres, or about 65 l. sterling; and the half purse in proportion: the purse of gold

gold is 15000 sequins, equal to 30000 french crowns, or about 3750 l. sterling: this is seldom used but for presents to favourites, so that a purse simply signifies a purse of silver, or 1500 livres. The merchants also use dutch dollars, called astani or abouquels, with medins and aspers: the dollar is equal to 35 medins, and the medin to 3 aspers; the asper to a halfpenny sterling money.

Asiatic MONIES of account are as follow. In Persia, they account by the taman (called alsoman and tumein) and dinar bisti; the taman is composed of 50 abassis, or 100 mamodies, or 200 chapes, or 10000 dinars; which, accounting the abassi on the foot of 18 french sols, or the dinar on that of a denier, amounts to 3 l. 12 s. 6 d. sterling the taman. They also account by larins, especially at Ormus, and on the coast of the Persian gulph: the larin is equivalent to 11 d. sterling; and on that footing is used also in Arabia, and through a great part of the East-Indies. Chinese moneys of account are the pic, picol, and tael; which, though in effect weights, do likewise serve as money of account, obtaining in Tonquin as well as China: the pic is divided into 100 caties, some say 125; the cati into 16 taels, each tael equal to one ounce two drachms: the picol contains $66\frac{3}{4}$ caties; the tael is equivalent to 6 s. 8 d. sterling.

Japoneſe moneys of account are the schuities, cockiens, oebans or oubans, and taels: 200 schuities are equal to 500 dutch pounds, the cockien equal to 10 low-country pounds, 1000 oebans make 45000 taels.

Mogul money of account: at Surat, Agra, and the rest of the estates of the great Mogul, they use lacres, acreses, or leeths, implying one hundred thousand; thus a lacre of rupees is 100000 rupees; the lacre being nearly on the footing of the tun of gold in Holland, and the million of France.

Monies of account of other islands and coasts of India. Throughout Malabar, and at Goa, they use tangas, vintins, and pardos-xeraphin: the tanga is of two kinds, viz. of good and bad alloy; hence their custom is to count by good or bad money; the tanga of good alloy is better by one fifth than the bad, so that 4 tangas good being allowed the pardos-xeraphin, there will be required 5 of the bad; 4 vintins good make a tanga likewise good; 15 barucos, a vintin; a good baruco is equal to a portuguese

ree, a french denier, or one thirteenth of a penny sterling. In the island of Java they use the sonta, sapacou, fardos, and catis; which last money, together with the leeth or lacre, is much used throughout all the East-Indies: the sonta is 200 caxas, or little pieces of that country, hung on a string, and is equal to eleven twelfths of a penny sterling: five sontas make the sapacou. The fardos equal to 2 s. 8 d. sterling; the cati contains 20 taels; the tael 6 s. 8 d. sterling. There are islands, cities, and states of the East-Indies, whose monies of account are not here expressed, partly because reducible to some of the above-mentioned, and partly because we find no certain consistent account of them.

African MONEY of account. From Cape Verd to the Cape of Good-hope, all exchanges and valuations of merchandize are made on the foot of the macoute and piece; which, though no monies of account (for those barbarians have no real monies, and therefore need no imaginary ones to estimate them by) yet serve in lieu thereof. At Loango de Boirie, and other places on the coast of Angola, the estimations are made by macoutes; and at Malimbo and Cabindo, on the same coast, the negroes reckon by pieces: among the first the macoute is equal to 10 pieces; ten macoutes make 100, which likewise gives us a kind of imaginary money to estimate any purchase, exchange, &c. they fix on the one side the number of macoutes required; e. gr. for a negro; so that there are several bargains made for one; suppose, for instance, the slave to be fixed at 3500 pieces, this amounts to 350 macoutes; to make up this number of macoutes in merchandize, they fix the price of each in macoutes. Two flemish knives, ex. gr. are accounted one macoute; a copper-bason, 2 lb. weight, three; a barrel of gun-powder, three, &c. For the piece, it serves in like manner to estimate the value of goods, duties, &c. on either side: thus the natives require 10 pieces for a slave; and the europeans put, for instance, a fusée at 1 piece, a piece of salampours at 4 pieces, &c. The cities of Barbary and Egypt, whither the europeans traffic, reckon much after the same manner as in the Levant and the dominions of the grand signior; for the rest, through that vast extent of coast where we trade for negroes, gold-dust, elephant's teeth, wax, leather, &c. either the miserable inhabitants

bitants do not know what money of account is, or, if they have any, it is only what strangers, settled among them, have introduced.

MONIES of account in America. Here they have no money of their own; the respective monies of account of the Europeans, who have made settlements there, being established among them.

MONIES of account among the antients.

Grecian monies of account. The Greeks reckoned their sums of money by drachmæ, minæ, and talenta: the drachma was equal to $7\frac{1}{4}$ d. sterling; 100 drachmæ made the mina, equal to 3 l. 4 s. 7 d. sterling; 60 minæ made the talent, equal to 193 l. 15 s. sterling; hence 100 talents amounted to 19375 l. sterling.

The mina and talent indeed were different in different provinces: the proportions in attic drachms are as follows; the syrian mina contained 25 attic drachms; the ptolemaic, $33\frac{1}{3}$; the antiochic and eubæan, 100; the babylonic, 116; the greater attic and tyrian, $133\frac{1}{3}$; the æginean and rhodian, $166\frac{2}{3}$; the syrian talent contained 15 attic minæ, the ptolemaic 20, the antiochic 60, the eubæan 60, the babylonic 70, the greater attic and tyrian 80, the æginean and rhodian 100.

Roman monies of account were the sestertius and sestertium: the sestertius was nearly equal to 2 d. sterling; 1000 of these made the sestertium, equal to 8 l. 1 s. $5\frac{1}{2}$ d. sterling; 1000 of the sestertia made the decies sestertium (the adverb *centies* being always understood) equal to 8072 l. 18 s. 4 d. sterling; the decies sestertium they also called the decies centena millia nummum. Centies sestertium, or centies H. S. were equal to 80729 l. 3 s. 4 d. Millies H. S. were equal to 807291 l. 13 s. 4 d. Millies centies H. S. equal to 888020 l. 16 s. 8 d.

False, or Base MONEY, is either that struck by an unqualified person, and of unstatutable metals; or that which has lost of its weight, either by being clipped on the corners, or filed on the edges; or, lastly, by having some of its surface eaten off, if gold, by aqua regia; if silver, by aqua fortis. Another kind of base money, is that made of pieces of iron, copper, or other metal, covered on each side with a thin plate or leaf of gold or silver, neatly soldered and joined round the edges, and struck, like other coin, with figures, legends, &c.

MONEYERS, MONEYORS, or MONIERS,
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officers of the mint, who work and coin gold and silver money, and answer all waste and charges. See **MINT**.

MONFORTE, the name of two towns in Portugal, the one in the province of Alentejo, and the other in that of Beira.

MONGUL, or MOGUL, a part of Tartary, lying east of India and Persia.

MONIKEDAM, a town of the united Netherlands, in the province of Holland, eight miles north east of Amsterdam.

MONITORY LETTERS, are letters of warning and admonition, sent from an ecclesiastical judge, upon information of scandals and abuses, within the cognizance of his court.

MONK, a person who wholly dedicates himself to the service of religion, in some monastery, under the direction of some particular statutes and rules.

The most probable account of the original of the monks is, that in the decian persecution, in the middle of the III^d. century, many persons in Egypt, to avoid the fury of the storm, fled to the neighbouring deserts and mountains, where they not only found a safe retreat, but also more time and liberty to exercise themselves in acts of piety and divine contemplations; which sort of life became so agreeable, that when the persecution was over, they refused to return to their habitations again, choosing rather to continue in those cottages and cells, which they had made for themselves in the wilderness. From that time to the reign of Constantine, monachism was confined to the hermits or anachorets, who lived in private cells in the wilderness: but when Pachomius had erected monasteries, other countries presently followed the example. See the article **MONASTERY**.

The manner of admission to the monastic life was usually by some change of habit, not to signify any religious mystery, but only to express their gravity and contempt of the world. Long hair was always thought an indecency in men, and favouring of secular vanity, and therefore they polled every monk at his admission, to distinguish him from seculars; but they never shaved them, lest they should look like the priests of Isis. St. Jerom speaking of the habits of the monks, intimates that it differed from that of others only in this, that it was cheaper, coarser, and meaner raiment. We read of no solemn vow, or profession, required at their admission; but they underwent a triennial probation, during which time they were

inured to the exercises of the monastic life. If, after that time was expired, they chose to continue the same exercises, they were then admitted, without any farther ceremony, into the community. As the monasteries had no standing revenues, all the monks were obliged to maintain themselves by their daily labour: they had no idle mendicants among them, but looked upon a monk who did not work, as a covetous defrauder. Every ten monks were subject to one, who was called the decanus, or dean, from his presiding over ten; and every hundred had another officer called centenarius, from his presiding over an hundred; and above these were the fathers of the monasteries, also called abbots. The business of the deans was to exact every man's daily task, and carry it to the steward, who gave a monthly account of it to the abbot. See the article ABBOT.

For a particular account of the present monastic orders, see AUGUSTINS, BENEDICTINES, CARMELITES, DOMINICANS, FRANCISCANS, &c.

MONK-FISH, *squatina*. See SQUATINA.

MONK-SEAM, among sailors, is the sewing the edges or selvages of sails together, over one another on both sides, to make it the stronger.

MONKEY, *simia*, in zoology, a numerous genus of quadrupeds of the order of the anthropomorpha, or quadrupeds that resemble the human figure: their face is naked; the claws are rounded and flattish, in some degree like the nails on the human hand; and they have both an upper and lower eye-lid.

Of all the animals of the monkey-kind, the satyr resembles mankind most; its face is naked, and is very like that of an aged and not handsome man; it has no tail, and in other respects greatly resembles the human form. The most like, next to this, is the oran-outang, or black-faced monkey, called the savage; and the next to this is the baboon, or whiskered simia, with a short tail: the rest of the monkeys, of which there are a great many kinds, differing widely both in size and figure, have nevertheless something of the human aspect; and as they are tractable animals, people make them walk erect with a staff, and perform many tricks, to shew their resemblance; but, in general, such monkeys as have no tails, have more of this likeness than those that have. See plate CLXXXI.

fig. 1.

MONLUSON, or MOULUCON, a town of the Lyonois, in France, forty-five miles south of Bourges.

MONMOUTH, the capital of Monmouthshire, situated on the river Wye, twenty-five miles north of Bristol.

It sends two members to parliament.

MONOCHORD, a musical instrument, composed of one string, used to try the variety and proportion of sounds.

It is formed of a rule, divided and subdivided into several parts, on which there is a moveable string stretched upon two bridges, at each extreme. In the middle between these is a moveable bridge, by means of which, in applying it to the different divisions of the line, the sounds are found to bear the same proportion to each other, as the division of the line, cut by the bridge. There are also monochords with forty-eight fixed bridges.

The monochord is also called the harmonical canon, or the canonical rule, because it serves to measure the degrees of gravity or acuteness.

Monochord is also used for any musical instrument, that consists of only one string or chord; in this sense the trumpet-marine may properly be called a monochord.

MONOCULUS, in zoology, a genus of crustaceous water-insects of the aptera-order, the body of which is short, roundish, and covered with a firm crustaceous skin; its fore-legs are ramose, and serve for leaping and swimming; and it has only one eye, composed of three smaller ones.

MONODON, in ichthyology, a fish of the whale-kind, otherwise called narwal, or the sea-unicorn. See NARWAL.

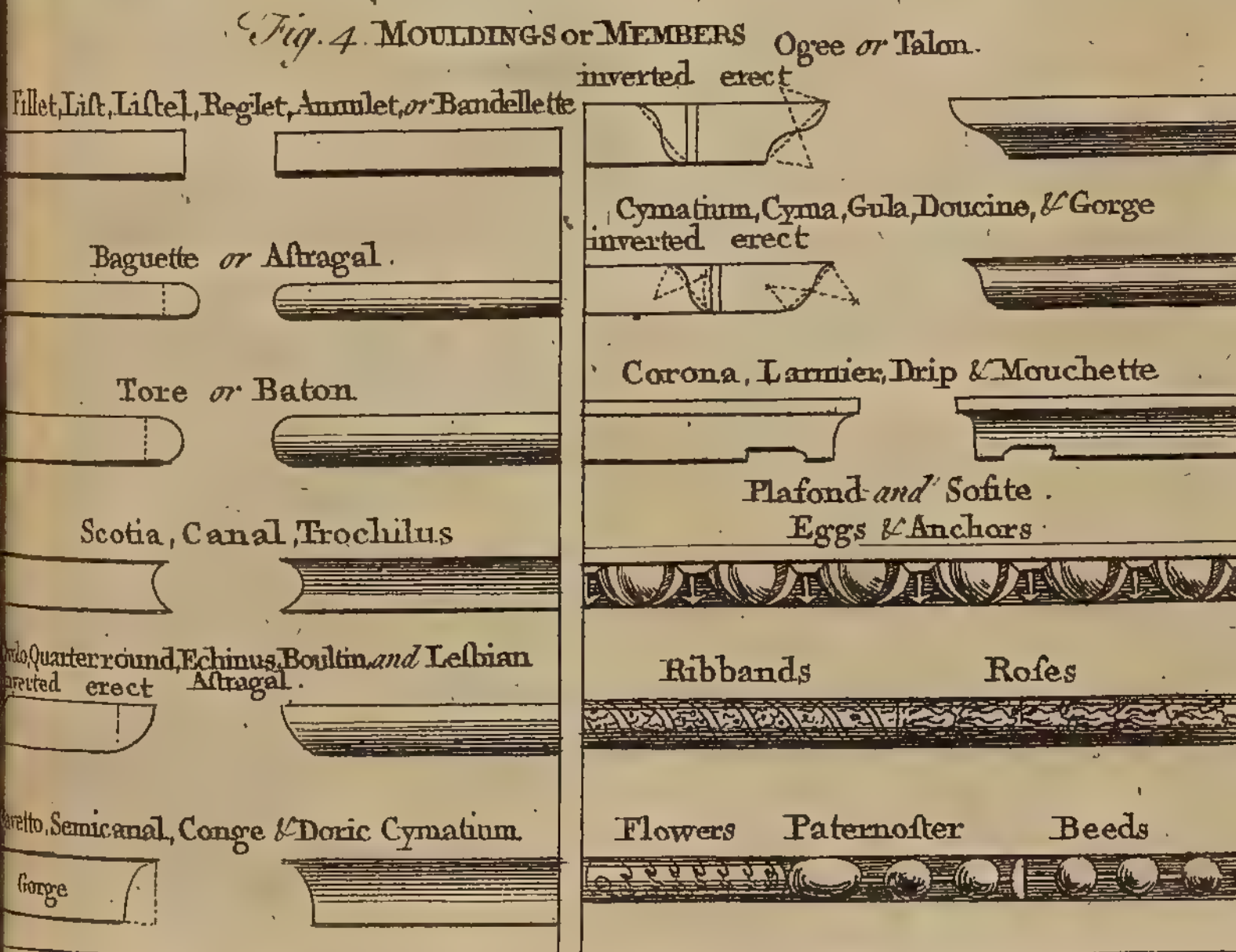
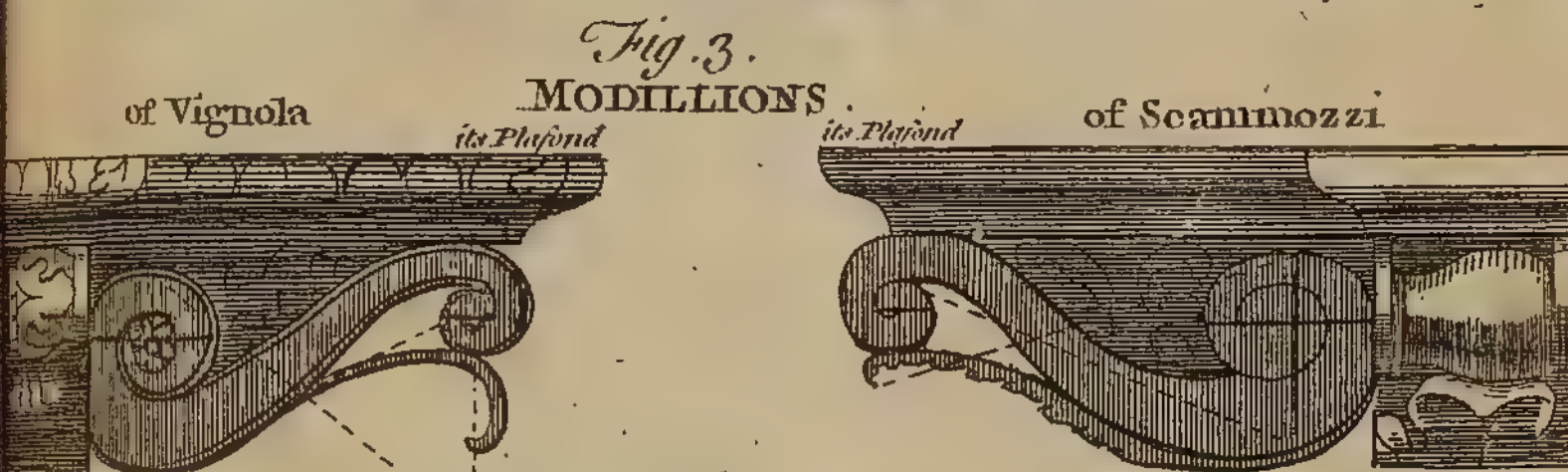
MONODY, in antient poetry, a mournful kind of song, sung by a person all alone, to give vent to his grief.

MONOECIA, in botany, one of Linnæus's classes of plants, the twenty-first in order; in which the male and female flowers are placed separately on the same plant, or rather on different stalks growing from the same root.

Of the plants belonging to this class, some have only one stamen, and others have three, four, five, six, or more stamens; whence the subordinate orders of monoecia-monandria, monoecia-triandria, &c. others again are monadelphous, others syngenesious, and others gynandrous.

MONOGAMY, the state or condition of those who have only been once married, and are restrained to a single wife. See the article MARRIAGE.

MONO.



MONOGRAM, a character or cypher, composed of one, two, or more letters, intervoven; being a kind of abbreviation of a name, antiently used as a seal, badge, arms, &c.

The use of arms is very antient, as appears from Plutarch, and from some greek medals of the time of Philip of Macedon and Alexander his son. The roman labarum bore the monogram of Jesus Christ, which consisted of two letters, a P placed perpendicularly through the middle of an X, as we find it on many medals in the time of Constantine, these being the two first letters of the word ΧΡΙΣΤΟΣ. Thus under the eastern empire it is usual to find MIK, which are the monogram of Mary, Jesus, Constantine.

MONOLOGUE, in poetry, a dramatic scene, in which a person appears alone on the stage, and speaks to himself.

MONOMIAL, in algebra, a root or quantity that has but one name, or consists of only one member, as *a b*, *a a b*, &c. See **ROOT**, **QUANTITY**, **BINOMIAL**, &c.

MONOMOTOPA, a country of Africa, bounded by Monemugi on the north, and by Cafraria on the east, south, and west.

MONOPETALOUS, in botany, a term applied to flowers that have only one petal, or flower-leaf.

MONOPOLI, a town in the kingdom of Naples, situated on the gulph of Venice: east long. 18° , and north lat. $41^{\circ} 5'$.

MONOPOLY, one or more persons making themselves the sole masters of the whole of a commodity, manufacture, and the like, in order to make private advantage of it, by selling it again at a very advanced price. A monopoly is also an allowance of the king, by grant, or otherwise, for the sole dealing in any thing, by which others are restrained from any freedom they had before.

Monopolies are against the antient fundamental laws of this kingdom; and it is held, that the making use of, or promoting any unlawful monopoly, is punishable at common law, by fine and imprisonment. By statute, all monopolies, grants, &c. for the sole buying, selling, or making of goods and manufactures are declared void; and the person injured thereby, may recover treble damages and double costs, by action on the statute: but this act does not extend to any privilege granted by parliament; nor to companies or societies of merchants, or corporations, &c. neither to any grant

for printing, or to inventors of new manufactures, who have patents for the term of fourteen years.

MONOPTERE, in architecture, a kind of temple, round, and without walls, having a dome supported by columns.

MONOPTOTON, in grammar, a noun that has only one case, as *inficias*.

MONOPYRENEOUS, in botany, such fruit as contains only one seed, or kernel.

MONORHYME, a piece of poetry, in which all the verses end with the same rhyme.

MONOSTICH, an epigram that consists of only one single verse. See the article **EPIGRAM**.

MONOSYLLABLE, in grammar, a word that consists of only one syllable, and is composed of either one or more letters pronounced at the same time.

The too frequent use of monosyllables, has a very bad effect in English poetry, as Mr. Pope both intimates and exemplifies in the same verse, *viz.*

“ And ten slow words oft creep in one dull line.”

MONOTHELITES, a sect of Christians in the VIIth century, so called from their maintaining, that though there were two natures in Jesus Christ, the human and divine, there was but one will, which was the divine.

MONOTONY, an uniformity of sound, or a fault in pronunciation, when a long series of words are delivered in one unvaried tone.

MONOTROPA, in botany, a genus of the decandria-monogynia class of plants, the flower of which consists of ten oblong deciduous petals, serrated at the tops: the fruit is an oval, pentagonal, obtuse capsule, containing a great number of paleaceous seeds.

This genus comprehends the *orobanchoides* of Tournefort, and the *hypopitys* of Dillenius.

MONS, the capital of the province of Hainalt, in the austrian Netherlands: situated twenty-six miles south-west of Brussels: east long. $3^{\circ} 33'$, and south lat. $50^{\circ} 34'$.

MONSARAZ, a town of Portugal, in the province of Alentejo: west long. 8° , and north lat. $38^{\circ} 30'$.

MONSEIGNEUR, MY LORD, a title of honour used by the French, in writing or speaking to dukes, peers, archbishops, bishops, and presidents à mortier. Monseigneur absolutely used, is a title now restrained to the dauphin of France;

thus it is said, an officer belonging to monseigneur: but this custom was not introduced till the reign of Lewis XIV. the dauphin before that time being called monsieur le dauphin.

MONSIEUR, a title of civility used by the French, in speaking to, or of their equals, or those that are but a little below them: thus a duke or a marquis, when speaking to an equal or inferior, uses the word monsieur; and a mechanic speaking to a mechanic, gives him the same title: but no body calls the french king monsieur, except the children of France.

In France the inscriptions of all letters run thus; *A monsieur monsieur* such a one. Monsieur, absolutely used, is a title given to the second son of France, and to the king's brother.

MONSOON, in physiology, a species of trade-wind, in the East-Indies, which for six months blows constantly the same way, and the contrary way the other six months. See the article **WIND**.

However, it ought to be observed, that the points of the compass from whence the monsoons blow, as well as the times of their shifting, differ in different parts of the Indian ocean.

The cause of monsoons is this: when the sun approaches the northern tropic, there are countries, as Arabia, Persia, India, &c. which become hotter, and reflect more heat than the seas beyond the equator, which the sun has left; the winds, therefore, instead of blowing from thence, to the parts under the equator, blow the contrary way; and, when the sun leaves those countries, and draws near the other tropic, the winds turn about, and blow on the opposite point of the compass.

MONSTER, *monstrum*, in general, denotes any production that deviates from the species to which it belongs, whether with respect to the number or disposition of its parts; in which sense, a man with six fingers on each hand, or six toes on each foot, is a monster. But the term monster seems to be chiefly applied to such productions as deviate very much from the ordinary course of nature.

MONSTIERS, or **MOUSTIERS**, a city of Savoy, thirty miles south east of Chambery.

MONSTRANS DE DROIT, in law, is a writ which issues out of the court of chancery, for restoring a person to lands or tenements, that are his in right.

MONSTRANS DE RAIT, in law, is pro-

ducing the deeds in open court, when an action is brought upon any deed.

MONSTRAVERUNT, in law, is a writ in behalf of a tenant that holds lands by free-charter in antient demesne, on his being distrained for the payment of any service or imposition, contrary to the liberty he does or ought to enjoy. It also lies where a tenant is unjustly distrained for the payment of toll.

A writ of monstraverunt may be issued out by any number of tenants, without naming any of them by their proper names, but only in general, the men of such a place.

MONT-ALTO, a town of Italy, in the pope's territories, and marquisate of Ancona, twenty-three miles south of Loreto.

MONT ST. ANDRE, a town of the Austrian Netherlands, in the province of Brabant, eleven miles north of Namur.

MONTARGIS, a city of France, in the province of Orleans, fifty miles south of Paris.

MONTAUBAN, a city of France in the province of Guienne, eighteen miles north of Toulouse.

MONTBELLiard, a city of France, in the province of Franche-comte, thirty-five miles north-east of Besancon.

MONTESANCTO, or **MOUNT-ATHOS**, a mountain of European Turkey, in the province of Macedon: east long. 23°, and north lat. 40° 12'.

It is called Monte Sancto, or Holy Mountain, from twenty-two monasteries situated upon it, in which are four thousand monks or friars, who never suffer a woman to come within sight of their convent.

MONTFERRAT, a duchy in Italy bounded by the lordship of Verceil on the north, by the Alexandrin on the east, by the territory of Genoa on the south, and by the county of Asti on the west. The chief town is Casal.

MONTFORT, the capital of the county of Montfort, in the circle of Swabia, in Germany: east long. 9° 40', and north lat. 47° 15'.

MONTGOMERY, the capital of Montgomeryshire, in Wales, situated on the river Severn, twenty miles south-west of Shrewsbury.

MONTH, *mensis*, in chronology, the twelfth part of a year. See the article **YEAR**.

Time being duration, marked out for certain uses, and measured by the notion

tion of the heavenly bodies, there thence results divers kinds of months as well as years, different from one another according to the particular luminary by whose revolution they are determined, and the particular purposes they are destined for: hence months are of two kinds, astronomical and civil.

An astronomical month is that which is governed either by the motion of the sun or moon, and is consequently of two kinds, solar and lunar: a solar month is that time, in which the sun seems to run through a whole sign, or the twelfth part of the ecliptic.

Hence, if regard be had to the sun's true apparent motion, the solar month will be unequal, since the sun is longer in passing through the winter-signs than through those of the summer; but as he constantly travels through all the twelve signs in 365 days, 5 hours, and 49 minutes, the quantity of a mean month will be had, by dividing that number by 12; on this principle, the quantity of a solar month will be found to be 30 days, 10 hours, 29 minutes, 5 seconds. See EARTH.

A lunar month is that space of time which the moon takes up in performing its course through the zodiac, or that measured by the motion of the moon round the earth; and is of three kinds, *viz.* periodical, synodical, and that of illumination. The lunar periodical month, is the space of time wherein the moon makes her round through the zodiac, or wherein she returns to the same point, being 27 days, 7 hours, 43 minutes, 5 seconds. See the article MOON.

The lunar synodical month, called also absolutely the lunar month and lunation, is the space of time between two conjunctions of the moon with the sun; or the time it takes from one conjunction with the sun to the next; or from one new moon to another: the quantity of a synodical month is 29 days, 12 hours, 44 minutes, 43 seconds, and 11 thirds. The quantity of a synodical month is not the same at all times, for in the summer solstice, when the sun seems to move slowest, the synodical month appeareth less, being about 29 days, 6 hours, 42 minutes; but in the winter, when the sun's motion seems faster, the moon does not fetch up the sun so soon, for which reason the synodical month then seems greater, *viz.* 29 days, 19 hours, and 37 minutes, according to the observation of the same astronomers: so that the first quantity given

of the synodical month, is to be understood as to the mean motion. From what has been said, it may easily appear that the difference between a periodical and synodical month is this; the first is called periodical in respect of the moon's orbit; but the synodical is so called in respect of its connection with the other luminary. Now after the time of its conjunction, the sun does not continue in the same place of the zodiac, but moves forwards towards the east, upon which it falls out that the moon, finishing its course, does not find the sun again in the same place where it left him, he being removed almost a whole sign from his former place, so that to overtake the sun again, it plainly appears that a certain space of time is requisite besides the periodical, which makes up the synodical month.

The antient Romans made use of the lunar months, and made them alternately of 29 and 30 days; and they marked the days of each month by three terms, *viz.* calends, nones, and ides. See the articles CALENDs, &c.

The lunar month of illumination, or apposition, or illuminative month, is the space from the first time of the moon's appearance after new moon, to her first appearance after the new moon following. The lunar month of illumination is not of any determined quantity, because the moon appears sometimes sooner, and sometimes later, after the conjunction; for which diversity astronomers give us several reasons, particularly the obliquity of the zodiac, the variable latitude of the moon, the apparent inequality of its motion, the different qualities of the summer and winter-air, &c. By this month, however, the Turks and Arabs go; and it is said that the antient Britons went by the phases of the moon.

A civil or political month, consists of a certain number of days according to the laws and customs of the different countries wherein it is used, either having no regard to the solar or lunar months, as those of the Egyptians in their equal year, of the Romans in the year of Romulus, &c. or coming pretty near to the solar astronomical month, as the julian; or else the lunar astronomical, as the jewish, turkish, and others. The british and most european nations make 12 months in the year, *viz.* January, February, &c. See the articles JANUARY, &c.

Civil solar months, are such civil months as are accommodated to the astronomical months,

months, or those which are to consist alternately of 30 and 31 days, excepting one month of the twelve, which, for every fourth year, consisted of 30 days, and for the other years of 29. This form of civil months was introduced by Julius Cæsar; but under Augustus the sixth month, till then, from its place, called Sextilis, was denominated Augustus, in honour of that prince; and to make the compliment yet the greater, a day was added to it, so that it now consists of 31 days, though till then it had only 30: to make up for which, a day was taken from February, so that from thenceforward it only consisted of 28 days, and every fourth year of 29; though before it had ordinarily consisted of 29 days, &c. and such are the civil or calendar months which now obtain throughout Europe.

Civil lunar months are to consist alternately of 29 and 30 days: thus will two civil months be equal to two astronomical ones, abating for the odd minutes, and consequently the new moon will be hereby kept to the first day of each such civil month, for a long time together. However, to make them keep constantly pace with the civil months, at the end of each 948 months, a month of 29 days must be added; or else every 33d month must consist of 30 days. This was the month in civil or common use among the Jews, Greeks, and Romans, till the time of Julius Cæsar.

Philosophical MONTH, among chemists, is the space of 40 days and nights.

MONTIA, **BLINKS**, in the linnæan system of botany, a genus of the triandria-trigynia class of plants, the corolla whereof consists of a single petal, and is divided at the extremity into five parts; three of the segments are smaller than the others, and produce stamina; these stand alternately with the two larger: the fruit is a turbinated obtuse capsule, covered by the cup, composed of three valves, and having three cells; the seeds are three in number and roundish.

MONTIFRINGILLA, the **BRAMBLING**, in zoology, a species of the fringilla, with the base of the wings a gold-yellow underneath. See **FRINGILLA**.

MONTMARIANO, a town of Italy, in the kingdom of Naples and further Principate, situated thirty-five miles east of Naples.

MONTMEDY, a town of the Austrian Netherlands, in the province of Luxem-

burg; situated twenty miles west of Luxemburg.

MONTMELIAN, a fortress in the duchy of Savoy, situated on the frontiers of Dauphiné, ten miles south of Chamberry.

MONTPAGNOTE, or **POST** of the *invulnerable*, in the military art, an eminence chosen out of the reach of the cannon of a place besieged, where curious persons post themselves, to see an attack, and the manner of the siege, without being exposed to any danger.

MONTPELIER, a city of France, in the province of Languedoc and county of Nîmes, situated on the little river Lez, fifty miles north-east of Narbonne, and forty-five miles south-west of Avignon; a place famous for its delightful situation, its healthy serene air, and medical compositions.

MONTREAL, a city of Sicily, in the province of Mazara, situated near the sea, five miles east of Palermo.

MONTREAL is also a town of Canada, in North America, situated on the river of St. Laurence, one hundred miles south of Quebec.

MONTREVIL, a town of France, thirty miles south of Calais.

MONTROSE, a town of North Britain, in the shire of Angus, situated at the mouth of the river Esk, on the German ocean, forty-six miles north-east of Edinburgh.

Steel-spaws are very numerous in the country about Montrose; besides these there is a well near this town, whose water is of a whitish colour, soft taste, and faintly discovering a mineral quality, and is of a different nature from the steel one. It is universally diuretic; and has been found useful in stranguries, stoppages of urine, scorbutic disorders, flatulencies, &c.

MONTROYAL, or **MONTREAL**, a fortress of Germany, in the circle of the lower Rhine and electorate of Triers, situated twenty miles north-east of Triers.

MONTSERAT, a mountain of Spain, in the province of Catalonia, twenty-one miles north-west of Barcelona; where there is a monastery and chapel dedicated to the Virgin Mary, to which there is a great resort of pilgrims.

MONTSERAT is also one of the smallest of the Caribbee-islands, subject to Great Britain: it is situated about thirty miles south-west of Antigua.

MONUMENT, in architecture, a building destined to preserve the memory, &c. of the

the person who raised it, or for whom it was raised; such are a triumphal arch, a mausoleum, a pyramid, &c. The first monuments that were erected by the ancients, were of stones, which were laid over tombs, on which were cut the names and actions of the deceased. These stones were distinguished by various names, according as their figures were different: the Greeks called those which were square at the base, and were the same depth throughout their whole length, steles; from whence our square pillasters, or attic columns, are derived: those which were round in their base, and ended in a point at top, they called styles; which gave occasion to the invention of diminished columns: those which were square at the foot, and terminated in a point at the top, in the manner of a funeral pile, they called pyramids: to those whose bases were more in length than in breadth, and which rose still lessening to a very great height, resembling the figure of the spits or instrument used by the ancients in roasting the flesh of their sacrifices, they called obelisks. See OBELISKS, &c.

The MONUMENT, absolutely so called among us, is a magnificent pillar, erected by order of parliament, in memory of the burning of the city of London, *anno* 1666, in the very place where the fire began. This pillar is of stone, of the doric order, and fluted. It is one of the boldest pieces of architecture that ever was attempted, being 202 feet high, and the diameter 15; it stands on a pedestal 40 feet high, and 21 feet square, the front being enriched with curious emblems in basso relievo: within are winding stairs, up to the very top.

MONYCHA, among naturalists, an appellation given to animals with single or undivided hoofs. See the article HOOF.

MOOD, or MODE, in logic, called also syllogistic mood; a proper disposition of the several propositions of a syllogism, in respect of quantity and quality. See the articles SYLLOGISM, QUANTITY, and QUALITY.

As in all the several dispositions of the middle term, the propositions of which a syllogism consists, may be either universal or particular, affirmative or negative; the due determination of these, and putting them together as the laws of argumentation require, constitute what logicians call the moods of syllogisms. Of these moods there are a determinate number to every figure, including all the pos-

sible ways in which propositions, differing in quantity or quality, can be combined, according to any disposition of the middle term, in order to arrive at a just conclusion. There are two kinds of moods, the one direct, the other indirect.

The direct mood is that wherein the conclusion is drawn from the premises directly and immediately, as, "Every animal is a living thing, every man is a living animal; therefore, every man is a living thing." There are fourteen of these direct moods, four whereof belong to the first figure, four to the second, and six to the third. They are denoted by so many artificial words framed for that purpose, *viz.* 1. Barbara, celarent, darrii, ferioque. 4. Baralip, celantes, dabit, fapesmo, frilesom. 2. Cesare, camestres, festino, baroco. 3. Darapti, selapton, disamis, datisi, bocardo, ferison. The use and effect of which words lie wholly in the syllables, and the letters whereof the syllables consist; each word, for instance, consists of three syllables, denoting the three propositions of a syllogism, *viz.* major, minor, and conclusion: add, that the letters of each syllable are either vowels or consonants; the vowels are A, which denotes an universal affirmative; E, an universal negative; I, a particular affirmative; and O, a particular negative: thus Barbara is a syllogism or mood of the first figure, consisting of three universal affirmative propositions: Baralip, one of the fourth figure, consisting of two universal affirmative premises, and a particular affirmative conclusion. The consonants are chiefly of use in the reduction of syllogisms. See FIGURE and REDUCTION.

The indirect mood, is that wherein the conclusion is not inferred immediately from the premises, but follows from them by means of a conversion; as, "Every animal is a living thing, every man is an animal; therefore some living thing is a man."

MOOD, or MODE, in grammar, the different manner of conjugating verbs, serving to denote the different affections of the mind. See the article VERB.

Hence arise four moods, *viz.* the indicative, subjunctive, and imperative: of these the three first are called finite moods, because they define a certain person and number; but the fourth is called the infinitive, because in it there is no distinction of either person or number. See the article INDICATIVE, &c.

Some grammarians reckon five moods, *viz.*

viz. the indicative, subjunctive, optative, imperative, and infinitive; and some make six, dividing the optative into potential and optative. See the articles OPTATIVE and POTENTIAL.

The Greeks have five moods, differing in termination; but the Latins have only four. The english terminations are the same in all the moods.

MOOD, or MODE, in philosophy, and in music. See the article MODE.

MOON, *luna*, ☾, in astronomy, a satellite; or secondary planet, always attendant on our earth.

Of the six primary planets, we find but three that are certainly attended with moons, *viz.* the earth, jupiter, and saturn; for though Mr. Short has given an account of a phænomenon that he observed some years ago, which seems extremely like a moon about venus, yet, as it was never observed before nor since, through the best of telescopes, it does not appear to be a moon. See the articles JUPITER, EARTH, and SATURN.

Astronomers have drawn the face of the moon, according as it is seen with the best telescopes; for which we are obliged to the accurate labours of the famous selenographers Florentius, Langrenus, John Hevelius of Dantzic, Grimaldus and Ricciolus, Italians; who have taken particular care to note all the shining parts of the moon's face, and, for the better distinguishing them, they have given to each part a proper name. Langrenus and Ricciolus have divided the lunar regions among the philosophers and astronomers, and other eminent men; but Hevelius fearing lest the philosophers should quarrel about the divisions of the lands, has spoiled them of this their property, and given the parts of the moon those geographical names that belong to the different islands, countries, and seas of our earth, without any regard to their situation or figure. See plate CLXXXII. fig. 1.

That the surface of the moon is not smooth or even, but diversified with hills and vales, continents and seas, lakes, &c. any one would imagine, who views her face through a large telescope. That she has variety of hills and mountains is demonstrable from the line which bounds the light and dark parts not being an even regular curve, as it would be upon a smooth spherical surface, but an irregular broken line, full of dents and notches, as represented, *ibid.* fig. 2.

Also because some small (and many large) bright spots appear in the dark portion, standing out at several distances from the boundary line; which spots in a few hours become larger, and at last unite with the enlightened portion of the disk. For the method of measuring these lunar mountains, see MOUNTAIN.

On the other hand, we observe many small spots interspersed all over the bright part, some of which have their dark sides next the sun, and their opposite sides very bright and circular, which infallibly proves them to be deep, hollow round cavities; of which there are two very remarkable ones near together on the upper part, and may be viewed exceedingly plain, when the moon is about four or five days old. The depth of these lunar cavities prodigiously exceeds the height of the mountains, and consequently the surface of the moon has but little resemblance to that of the earth in these respects.

Since, then, the moon's surface appears to be so very mountainous and irregular, it has been a question, how it comes to pass that the bright circular limb of the disk does not appear jagged and irregular, as well as the curve bounding the light and dark parts: in answer to this, it must be considered, that, if the surface of the moon had but one row of mountains placed round the limb of the disk, the said bright limb would then appear irregularly indented; but since the surface is all over mountainous, and since the visible limb is to be considered not as a single curve line, but a large zone, having many mountains one behind another, from the observer's eye, it is evident the mountains in some rows being opposite to the vales in others, will fill up the inequalities in the visible limb in the remoter parts, which diminish to the sight and blend with each other, so as to constitute, like the waves of the sea, one uniform and even horizon. Whether there be seas, lakes, &c. in the moon, has been a question long debated, but now concluded in the negative: for in those large darker regions, which were thought to be seas, we view, through a good telescope, many permanent bright spots, as also caverns and empty pits, whose shadows fall within them, which can never be seen in seas or any liquid substance. Their dark and dusky colour may proceed from a kind of matter or soil, which reflects light less than that of the other regions. These spots

spots have continued always the same unchangeably, since they were first viewed with a telescope; though less alterations than what happen in the earth, in every season of the year, by verdure, snow, inundations, and the like, would have caused a change in their appearance. But indeed as there are no seas nor rivers in the moon, and no atmosphere, so of course there can be no clouds, rain, snow, or other meteors, whence such changes might be expected.

Sir Isaac Newton mentions an atmosphere about the moon; but other astronomers think there is reason (not to say a demonstration) for the contrary: for were there an atmosphere of air like ours, it must necessarily obscure the fixed stars in the moon's appulse to them; but it has been observed that this never happens: on the contrary, they preserve all their splendor to the moment of their occultation, and then disappear instantaneously, and in the same manner they recover their light, when they appear again on the other side.

The distance of our moon from the earth is determined by her horizontal parallax, or the angle which the semidiameter of the earth subtends at the moon, viz. the angle $A O C$ (*ibid.* fig. 3.) which is the difference between the true place of the moon's center O , when in the horizon, and the apparent place thereof, as viewed from the surface of the earth at A . The former is known by astronomical tables, the latter by observation: and the quantity of this difference, or angle, at a mean, is $57' 12'' = A O C$.

If therefore we say, as the tangent of $57' 12''$ is to radius, so is $A C = 1$ to $C O = 60,1$; this will be the mean distance of the moon in semidiameters of the earth. Therefore, since one semidiameter of the earth contains 3982 miles, we have $3982 \times 60,1 = 239318,2 = C O$ the mean distance of the moon.

The moon's apparent semidiameter $M O$ measures, at her mean distance, $15' 38'' = 938''$ by the micrometer, which is the quantity of the angle $M C O$. The earth's diameter, therefore, is to the moon's, as $3432''$ to 938 ; that is, as 109 to 30, or

as 3,63 to 1. Wherefore $\frac{30}{109} \times 7964 = 2192$ miles the moon's diameter.

Therefore the face of the earth, as it appears to the lunarians, is to the face of the moon, as it appears to us, as 109×109 to 30×30 , viz. as 11881 to 900, or

as 12,2 to 1. And the real bulk of the earth is to that of the moon as $109 \times 109 \times 109$ to $30 \times 30 \times 30$, viz. as 1295029 to 27000, that is, as 1295 to 27, or as 48 to 1 very nearly.

Since, as we have shewn, the mean distance of the moon is about 60 semidiameters of the earth; at the distance of the moon one degree of the earth's surface will subtend an angle of one minute, and will therefore be visible; but such a degree is equal to $69\frac{1}{2}$ miles; therefore a spot or place 70 miles in diameter, in the moon, will be just visible to the naked eye. Hence a telescope that magnifies about 100 times, will just discover a spot whose diameter is $\frac{1}{100}$ of 70 miles, or $\frac{7}{10}$ of a mile, of 3698 feet: and a telescope that will magnify 1000 times, will shew an object that is but $\frac{7}{1000}$ of a mile, that is, whose diameter is but 370 feet, or little more than 120 yards; and therefore will easily shew a small town or village, or even a gentleman's seat, if any such there be.

The time which the moon takes up in making one revolution about the earth, from a fixed star to the same again, is 27d. 7h. 43', which is called the periodical month. But the time that passes between two conjunctions, that is, from one new moon to another, is equal to 29d. 12h. 44' 3'', which is called a synodical month: for, after one revolution is finished, the moon has a small arch to describe to get between the sun and the earth, because the sun keeps advancing forward in the ecliptic. Now this surplus of motion takes up 2d. 5h. 1' 3'', which added to the periodical month makes the synodical, according to the mean motions.

The moon moves about its own axis in the same time that it moves about the earth, from whence it comes to pass that she always shews the same face to us: for by this motion about her axis, just so much of her surface is turned towards us constantly, as by her motion about the earth would be turned from us.

But since this motion about the axis is equable and uniform, and that about the earth, or common center of gravity, is unequal and irregular, as being performed in an ellipsis, it must follow that the same part of the moon's surface, precisely, can never be shewn constantly to the earth; and this is confirmed by the telescope, through which we often observe a little gore or segment on the eastern and western

western limb appear and disappear by turns, as if her body librated to and fro; which therefore occasioned this phenomenon to be called the moon's libration. The orbit of the moon is elliptical, more so than any of the planets, and is perpetually changing or variable, both in respect of its figure and situation; of which we shall treat more largely further on. The inclination of the moon's orbit to the plane of the ecliptic is also variable, from 5° to $5^{\circ} 18'$. The line of the nodes likewise has a variable motion from east to west, contrary to the order of the signs, and completes an entire revolution in a space of time a little less than nineteen years. Also the line of the apses, or of the apogee and perigee, has a direct motion from west to east, and finishes a revolution in the space of about nineteen years. All which will be more copiously treated of, when we come to explain the physical causes thereof.

The phases of the moon in every part of the orbit, are easily accounted for from her different situation with respect to the earth and sun; for, though to an eye placed in the sun she will always exhibit a complete illuminated hemisphere; yet in respect to the earth, where the hemisphere is viewed in all degrees of obliquity, it will appear in every degree from the greatest to the least; so that at E, (plate CLXXXII. fig. 4, and 5.) no part at all of the enlightened surface can be seen. At D, a little part of it is turned towards the earth, and from its figure it is then said to be horned. At C, one half of the enlightened surface is turned to the earth, and she is then said to be dichotomised, and in her first quarter or quadrature. At B, a part more than half is turned to the earth, and then she is said to be gibbous. At A, her whole illuminated hemisphere is seen, being then in opposition to the sun; and this is called the full moon. At H, she is again gibbous, but on the other part; at G she is again dichotomised, and in her last quarter; at F she is horned, as before; and then becomes new again at E, where she is in conjunction with the sun.

If MN be drawn perpendicular to the line SL joining the centers of the sun and moon, and OP perpendicular to the line TL joining the centers of the earth and moon, it is evident that the angle PLN in the first half of the orbit, and OLM in the second, will be propor-

tional to the quantity of the illuminated disk turned towards the earth; and this angle is every where equal to the angle ETL, which is called the elongation of the moon from the sun.

To find what quantity of the moon's visible surface is illustrated for any given time, we are to consider that the circle of illumination BFC, (*ibid.* fig. 6.) is oblique to the view every where, but at E and A; and therefore by the laws of the orthographic projection, it will be projected into an ellipse whose longest axis is the diameter of the moon BC, and the semi-conjugate is FL = cosine of the angle of elongation FBP. Hence FP = versed sine of the said angle. But from the nature of the circle and ellipse, we have LP in a constant ratio to FP, wherever the line OP is drawn perpendicular to B; therefore also $2LP = PO$ has a constant ratio to FP. But (by Euclid V. 12.) the sum of all the lines OP = area of the circle is to the sum of all the lines FP = area of the illuminated part, as the diameter of the circle OP to the versed sine of the elongation FP.

As the moon illuminates the earth by a reflex light, so does the earth the moon; but the other phenomena will be different for the most part. 1. The earth will be visible but to little more than one half of the lunar inhabitants. 2. To those who see it, the earth appears fixed, or at least to have no circular motion, but only that which results from the moon's libration. 3. Those who live in the middle of the moon's visible hemisphere, see the earth directly over their heads. 4. To those who live in the extremity of that hemisphere, the earth seems always nearly in the horizon, but not exactly there, by reason of the libration. 5. The earth, in the circle of a month, would have all the same phases as the moon has. Thus the lunarians, when the moon is at E, in the middle of their night, see the earth at full, or shining with a full face; at C and G it is dichotomised, or half light and half dark; at A it is wholly dark, or new; and at the parts between these it is gibbous. 6. The earth appears variegated with spots of different magnitudes and colours, arising from the continents, islands, oceans, seas, clouds, &c. 7. These spots will appear constantly revolving about the earth's axis, by which the lunarians will determine the earth's diurnal



diurnal rotation, in the same manner as we do that of the sun.

Theory of the Moon's motion. As the moon is the nearest to us in the solar system, and as great advantages may be deduced from her motions, we shall be the fuller on this subject. If then the sun acted equally on the earth and moon, and always in parallel lines, this action would only serve to restrain them in their annual motions round the sun, and no way affect their action on each other, or their motions about the common center of gravity. But because the moon is nearer the sun in one half of her orbit than the earth is, and at a greater distance in the other half, and the power of gravity being always greater at a less distance, it follows, that, in one half of her orbit, the moon is more attracted than the earth towards the sun, and in the other half less attracted; and hence irregularities necessarily arise in the motion of the moon, the excess in the first case, and the defect in the second, becoming a force that disturbs her motion: add to this, that the action of the sun on the earth and moon is not directed in parallel lines, but in lines that meet at the center of the sun. Suppose the moon setting out from the quarter that precedes the conjunction, with a velocity that would make her describe an exact circle round the earth, if the sun's action had no effect on her; and because her gravity is increased by that action, she must descend towards the earth, and move within that circle: her orbit there, will be more curve than otherwise it would have been; because this addition to her gravity will make her fall farther at the end of an arc below the tangent drawn at the other end of it; her motion will be accelerated by it, and will continue to be accelerated till she arrives at the ensuing conjunction; because the direction of the action of the sun upon her, during that time, makes an acute angle with the direction of her motion. At the conjunction, her gravity towards the earth being diminished by the action of the sun, her orbit will be less curve there for that reason; and she will be carried farther from the earth as she moves to the next quarter; and, because the action of the sun makes then an obtuse angle with the direction of her motion, she will be retarded by the same degrees by which she was accelerated before.

Thus she will descend a little towards

the earth, as she moves from the first quarter towards the conjunction, and ascend from it, as she moves from the conjunction to the next quarter. The action which disturbs her motion will have a like and almost equal effect upon her, while she moves in the other half of her orbit, or that half of it which is farthest from the sun: she will proceed from the quarter that follows the conjunction with an accelerated motion to the opposition, approaching a little towards the earth, because of the addition made to her gravity, at that quarter, from the action of the sun; and receding from it again, as she goes on from the opposition to the quarter from which we supposed her to set out. The areas described in equal times by a ray drawn from the moon to the earth will not be equal, but will be accelerated by the conspiring action of the sun, as she moves towards the conjunction or opposition from the quarters that precede them; and will be retarded by the same action, as she moves from the conjunction or opposition to the quarters that succeed them.

Sir Isaac Newton has computed the quantities of these irregularities from their causes. He finds, that the force added to the gravity of the moon in her quarters, is to the gravity with which she would revolve in a circle about the earth, at her present mean distance, if the sun had no effect on her, as 1 to $178\frac{29}{40}$. He finds the force subducted from her gravity, in the conjunctions and oppositions, to be double of this quantity, and the area described in a given time in the quarters, to be to the area described in the same time in the conjunctions and oppositions, as 10973 to 11073. He finds, that, in such an orbit, her distance from the earth in her quarters, would be to her distance in the conjunctions and oppositions, as 70 to 69.

From the same principle of gravitation, may the retrograde motion of the nodes be accounted for. See NODE.

The quantity of this retrograde motion is found by computation to be $19^{\circ} 18' 1''$ in a year, and the astronomical tables make it only $19^{\circ} 21' 21''$; so that the theory agrees nearly with observation.

The action of the sun diminishes the gravity of the moon towards the earth, in the conjunctions and oppositions, more than it adds to it in the quarters, and, by diminishing the force which retains the moon in her orbit, it increases her

distance from the earth and her periodic time: and because the earth and moon are nearer the sun in their perihelium than in their aphelium, and the sun acts with a greater force there, so as to subduct more from the moon's gravity towards the earth; it follows, that the moon must revolve at a greater distance, and take a longer time to finish her revolution in the perihelium of the earth, than in the aphelium; and this also is conformable to observation.

There is another remarkable irregularity in the moon's motion, which also arises from the action of the sun, *viz.* the progressive motion of the apsidal. In the quarters, the sun's action adds to the gravity of the moon, and the force it adds is greater, as the distance of the moon from the earth is greater; so that the action of the sun hinders her gravity towards the earth, from decreasing as much while the distance increases, as it ought to do according to the regular course of gravity; and therefore, while the moon is in the quarters, her apsidal must recede. In the conjunction and opposition, the action of the sun subducts from the gravity of the moon towards the earth; and subducts the more the greater her distance from the earth is, so as to make her gravity decrease more as her distance increases, than according to the regular course of gravity; and therefore, in this case, the apsidal are in a progressive motion. Because the action of the sun subducts more in the conjunctions and oppositions from her gravity, than it adds to it in the quarters, and, in general, diminishes more than it augments her gravity; hence it is that the progressive motion of the apsidal exceeds the retrograde motion; and therefore, the apsidal are carried round according to the order of the signs. Thus the various irregularities of the moon's motion are explained from gravity; and from this theory, with the assistance of a long series of accurate observations, her motion may be at length reduced so exactly to computation, and her appulses to the fixed stars, over which she passes in her course, may be predicted with so much accuracy, as to afford, on many occasions, an opportunity to navigators to discover their longitude at sea. From this theory, what by all astronomers was thought most difficult, and even impossible to be done, the incomparable Sir Isaac Newton has effected,

viz. To determine by calculation the moon's place, even in her quadratures, and all other parts of her orbit, besides the syzygies; and that so accurately, that the difference between that and her true place in the heavens, shall scarce be two minutes.

In 20 julian years, or 7305 days, the sun's mean motion was found to be 20 revolutions, 9 minutes, 4 seconds: and the motion of the sun's apogee, 21 minutes. The motion of the moon, in the same time, 247 revolutions, 4 signs, 13 degrees, 34 minutes, 5 seconds; the motion of the lunar apogee, 2 revolutions, 3 signs, 3 degrees, 50 minutes, 15 seconds; and the motion of her nodes, 1 revolution, 26 degrees, 50 minutes, 15 seconds: all which motions are accounted from the vernal equinox. Wherefore, if from them be subtracted the procession of the equinoctial point during that space, which is 16 minutes, there will remain the motions in reference to the fixed stars in 20 julian years, *viz.* The sun's 19 revolutions, 11 signs, 29 degrees, 52 minutes, 24 seconds; of his apogee, 4 minutes, 20 seconds. The moon's 247 revolutions, 4 signs, 13 degrees, 17 minutes, 25 seconds; of her apogee, 2 revolutions, 3 signs, 3 degrees, 33 minutes, 35 seconds; and of her nodes, 1 revolution, 27 degrees, 6 minutes, 55 seconds.

According to this computation, the tropical year is 365 days, 5 hours, 48 minutes, 57 seconds; and the sidereal year, 365 days, 6 hours, 9 minutes, 14 seconds. But these mean motions of the luminaries being affected with the inequalities already mentioned, render a number of equations and reductions necessary.

The annual equations of the foresaid mean motions of the sun and moon, and of the apogee and nodes of the moon, have been already treated of in the article EQUATION.

Only let it be observed, that if the equation of the sun's center be required to be added, then the equation of the moon's mean motion must be subtracted, that of her apogee must be added, and that of the node subducted. And, on the contrary, if the equation of the sun's center were to be subducted, the moon's equation must be added, the equation of her apogee subducted, and that of her node added.

There is also an equation of the moon's mean motion depending on the situation of

of her apogee, in respect of the sun; which is greatest when the moon's apogee is in an octant with the sun, and is nothing at all when it is in the quadratures or syzygies. This equation, when greatest and the sun in perigæo, is 3 minutes 56 seconds: but if the sun be in apogæo, it will never be above 3 minutes 34 seconds. At other distances of the sun from the earth, this equation, when greatest, is reciprocally as the cube of such distance. But, when the moon's apogee is any where but in the octants, this equation grows less, and is mostly at the same distance between the earth and the sun, as the sine of the double distance of the moon's apogee from the next quadrature or syzygy to the radius. This is to be added to the moon's motion, while her apogee passes from a quadrature with the sun to a syzygy; but this is to be subtracted from it, while the apogee moves from the syzygy to the quadrature.

There is, moreover, another equation of the moon's motion which depends on the aspect of the nodes of the moon's orbit with the sun: and this is greatest, when her nodes are in octants to the sun; and vanishes quite, when they come to their quadratures or syzygies. This equation is proportional to the sine of the double distance of the node from the next syzygy or quadrature, and at greatest is but 47 seconds. This must be added to the moon's mean motion, while the nodes are passing from their syzygies with the sun to their quadratures with him; but subtracted, while they pass from the quadratures to the syzygies.

From the sun's true place take the equated mean motion of the lunar apogee, as was above shewed, the remainder will be the annual argument of the said apogee. From hence the excentricity of the moon and the second equation of her apogee, may be compared after the manner following (which takes place also in the computation of any other intermediate equations).

Let T (*ibid.* fig. 7.) represent the earth, TS a right line joining the earth and sun, TACB a right line drawn from the earth to the middle or mean place of the moon's apogee, equated as above; let the angle STA be the annual argument of the aforesaid apogee, TA the least excentricity of the moon's orbit, TB the greatest; bisect AB in C, and on the center C, with the distance AC,

describe a circle AFB, and make the angle BCF = to the double of the annual argument. Draw the right line TF; that shall be the excentricity of the moon's orbit; and the angle BTF is the second equation of the moon's apogee required. In order to whose determination, let the mean distance of the earth from the moon, or the semidiameter of the moon's orbit, be 1000000; then shall its greatest excentricity TB, be 66782 such parts; and the least TA, 43319. So that the greatest equation of the orbit, *viz.* when the apogee is in the syzygies, will be 7 degrees, 39 minutes, 30 seconds, or perhaps 7 degrees, 40 minutes (for he suspects there will be some alteration according to the position of the apogee in cancer or capricorn). But, when it is in quadrature to the sun, the greatest equation aforesaid will be 4 degrees, 57 minutes, 56 seconds; and the greatest equation of the apogee 12 degrees, 15 minutes, 4 seconds.

Having from these principles made a table of the equation of the moon's apogee, and of the excentricities of her orbit to each degree of the annual argument, from whence the excentricity TF and the angle BTF (*viz.* the second and principal equation of the apogee) may easily be had for any time required: let the equation thus found be added to the first equated place of the moon's apogee, if the annual argument be less than 90 degrees, or greater than 180 degrees, and less than 270°, otherwise it must be subtracted from it; and the sum or difference shall be the place of the lunar apogee secondarily equated; which, being taken from the moon's place equated a third time, shall leave the mean anomaly of the moon corresponding to any given time. Moreover, from the mean anomaly of the moon, and the before found excentricity of her orbit, may be found (by means of a table of equations of the moon's center made to every degree of the mean anomaly, and some excentricities, *viz.* 45000, 50000, 55000, 60000, and 65000) the prosthaphæresis or equation of the moon's center, as in the common way: and this being taken from the former semicircle of the middle anomaly, and added in the latter to the moon's place thus thrice equated, will produce the place of the moon a fourth time equated.

The greatest variation of the moon (*viz.* that which happens when the moon is in an

an octant with the sun) is nearly, reciprocally, as the cube of the distance of the sun from the earth; let that be taken 37 minutes, 25 seconds, when the sun is in perigæo, and 33 minutes, 40 seconds, when she is in apogæo: and let the differences of this variation in the octants be made reciprocally as the cubes of the distances of the sun from the earth; and so let a table be made of the aforesaid variation of the moon in her octants (or its logarithms) to every 10th, 6th, or 5th distance of the mean anomaly: and, for the variation out of the octants, make, as radius to the sine of the double distance of the moon from the next syzygy or quadrature :: so let the aforesaid variation in the octant be to the variation congruous to any other aspect; and this added to the moon's place before found in the first and third quadrant (accounting from the sun) or subducted from it in the second and fourth, will give the moon's place equated a fifth time.

Again, as radius to the sine of the sum of the distances of the moon from the sun, and of her apogee from the sun's apogee (or the sine of the excess of that sum above 360 degrees) :: so is 2 minutes, 10 seconds, to a 6th equation of the moon's place, which must be subtracted, if the aforesaid sum or excess be less than a semicircle, but added, if it be greater. Let it be made also as radius to the sine of the moon's distance from the sun :: so 2 degrees 20 seconds to a seventh equation: which, when the moon's light is increasing, add, but when decreasing, subtract; and the moon's place will be equated a seventh time, and this is her place in her proper orbit.

But let it be observed, that the equation, thus produced by the mean quantity 2 degrees, 20 seconds, is not always of the same magnitude, but is increased and diminished according to the position of the lunar apogee. For if the moon's apogee be in conjunction with the sun's, the aforesaid equation is about 54 seconds greater. But when the apogees are in opposition, it is about as much less; and it librates between its greatest quantity 3 minutes 14 seconds, and its least 1 minute 26 seconds. And this is when the lunar apogee is in conjunction or opposition with the sun's: but in the quadratures, the aforesaid equation is to be lessened about 50 seconds, or 1 minute, when the apogees of the sun and moon are in conjunction; but if they are in opposition,

for want of a sufficient number of observations, he cannot determine whether it is to be lessened or increased. And, even as to the augment or decrement of the equation 2 minutes, 20 seconds, above-mentioned, he dares determine nothing certain, for the same reason, *viz.* the want of observations accurately made.

If the sixth and seventh equations are augmented or diminished in a reciprocal ratio of the distance of the moon from the earth, *i. e.* in a direct ratio of the moon's horizontal parallax, they will become more accurate: and this may readily be done, if tables are first made to each minute of the said parallax, and to every sixth or fifth degree of the augment of the sixth equation for the sixth, as of the distance of the moon from the sun for the seventh equation.

From the sun's place take the mean motion of the moon's ascending node, equated as above; the remainder shall be the annual argument of the node, whence its second equation may be computed after the following manner in the foregoing figure, *ibid.* fig. 7.

Let T, as before, represent the earth; TS a right line conjoining the earth and sun: let also the line TACB be drawn to the place of the aforesaid node of the moon, as above equated; and let STA be the annual argument of the node. Take TA from a scale, and let it be to AB :: as 56 to 3, or as 11 $\frac{2}{3}$ to 1. Then bisect AB in C, and on C as a center, with the distance CA, describe a circle, as AFB, and make the angle BCF, equal to double the annual argument of the node before found: so shall the angle BTF be the second equation of the ascending node; which must be added when the node is passing from the quadrature to a syzygy with the sun, and subducted when the node moves from a syzygy towards a quadrature. By which means the true place of the node of the lunar orbit will be gained: whence, from tables made after the common way, the moon's latitude and the reduction of her orbit to the ecliptic may be computed, supposing the inclination of the moon's orbit to the ecliptic to be 4 degrees, 59 minutes, 35 seconds, when the nodes are in quadrature with the sun; and 5 degrees, 17 minutes, 20 seconds, when they are in the syzygies.

And from the longitude and latitude thus found, and the given obliquity of the ecliptic 23 degrees, 29 minutes, the

right

right ascension and declination of the moon will be found.

The horizontal parallax of the moon, when she is in the syzygies at a mean distance from the earth, he makes to be fifty-seven minutes, 30 seconds; and her horary motion 33 minutes, 32 seconds, 32 thirds; and her apparent diameter 31 minutes, 30 seconds. But in her quadratures, at a mean distance from the earth, he makes the horizontal parallax of the moon to be 59 minutes, 40 seconds; her horary motion 32 minutes, 12 seconds, 2 thirds; and her apparent diameter 31 minutes, 3 seconds: the moon in an octant to the sun, and at a mean distance, hath her center distant from the center of the earth about $60\frac{2}{9}$ of the earth's semidiameters.

The sun's horizontal parallax he makes to be 10 seconds, and its apparent diameter, at a mean distance from the earth, 32 minutes, 15 seconds.

The atmosphere of the earth, by dispersing and refracting the sun's light, at least to the height of 40 or 50 geographical miles, casts a shadow upon the moon in a lunar eclipse, and thereby makes the earth's shadow larger than it would otherwise be; and to each mile of the earth's atmosphere, is correspondent a second in the moon's disc: hence the semi-diameter of the earth's shadow, projected upon the moon's disc, is to be increased about 50 seconds; or, which is all one in a lunar eclipse, the horizontal parallax of the moon is to be increased in the ratio of about 70 to 69.

MOON-DIAL. See the article DIAL.

MOON-EYED, in the manege, the same with moon-blind. See BLIND.

MOON-FISH, a species of the ostracion, otherwise called the orbis, or globe-fish. See the article OSTRACION.

MOON-SEED, *menispermum*, in botany. See the article MENISPERMUM.

MOON-TREFOIL, a plant otherwise called medicago. See MEDICAGO.

MOON-WORT, *lunaria*, in botany. See the article LUNARIA.

MOOR, in country affairs, denotes an unlimited tract of land, usually over-run with heath.

MOOR-BUZZARD, the english name of the yellow-legged falcon, with an iron-coloured body and yellow head. It is about the size of a common crow, and has its english name from building its nest in moorish and boggy places.

MOOR-COCK, or GOR-COCK, a species of

tetrao, with a forked tail, spotted with white underneath. It is a native of England, but very rare: the male is throughout of a very deep iron grey, without any variegation; and the female is also grey, but variegated with transverse lines of black.

MOOR'S HEAD, in the manege, &c. See the article HEAD.

MOOR-HEN, the english name of the galinula or tringa. See TRINGA.

MOOR-STONE, a valuable stone, much used in the coarser works of the present builders; being truly a white granite, of a marbly texture.

MOOR-TITLING, in ornithology, a name by which many call the oenanthe. See the article OENANTHE.

MOORING, or MOARING, in the sea-language, is the laying out the anchors of a ship in a place where she can ride secure.

Mooring across, is laying out an anchor on each side; and mooring along, is to have an anchor in a river and a hawser on shore.

When ships are laid up in ordinary, or are under orders of fitting for the sea, the moorings are laid out in harbours; and consist of claws, pendent chains, cables, bridles, anchors, swivels, jew's-harps, buoys, and chains.

MOOT, a difficult case argued by the young barristers and students at the inns of court, by way of exercise, the better to qualify them for practice, and to defend the causes of their clients. This, which is called mooting, is the chief exercise of the inns of court. Particular times are appointed for the arguing moot-cases: the place where this exercise is performed, was antiently called moot-hall; and there is a bailiff, or surveyor of the moots annually chosen by the bench, to appoint the moot-men for the inns of chancery, and to keep an account of the performance of exercises.

MORA, a town of Spain, in the province of New-Castile, eighteen miles south-east of Toledo.

MORAL, something belonging to manners, or the conduct of life. See the articles GOOD, EVIL, &c.

MORAL PHILOSOPHY, the same with ethics. See the article ETHICS.

MORAL SENSE, that whereby we perceive what is good, virtuous, and beautiful in actions, manners, and characters. See SENSE, ACTION, CHARACTER, &c.

MORAL of a fable. See FABLE.

MORA-

MORALITY, the science and doctrine of morals, otherwise called ethics. See the article **ETHICS**.

Morality may be defined to be the relation, conformity, or agreement of men's voluntary actions, to a rule, to which they are referred, and by which they are judged of. These moral rules seem to be of three sorts, with their different enforcements. 1. The divine law, whether known by the light of nature or the voice of revelation, which is the only true touchstone of moral rectitude, the consciences of men bearing witness either of the goodness or sinfulness of their actions; that is, whether as duties or sins they are like to procure them happiness, or misery, from the hands of the Almighty. 2. The civil law, which is the rule set by the commonwealth to the actions of those that belong to it: this rule nobody overlooks, the rewards and punishments being ready at hand to enforce it, extending to the protecting or taking away of the life, liberty, and estate of those who observe and disobey it. 3. The law of opinion and reputation, whereby virtue and praise, vice and blame, are ever found to accompany each other: now those who think not commendation and disgrace sufficient motives to engage mankind to accommodate themselves to the opinions and rules of those with whom they converse, seem little skilled in the history of mankind, since most people govern themselves chiefly by this law of fashion. See the article **RELATION**.

Moral philosophy contemplates human nature, its moral powers and connections, and from these deduces the laws of action: though it must be confessed, that different philosophers have established different systems concerning the foundation of morality, which the reader will find under the article **ETHICS**.

According to Mr. Locke, the idea of a supreme being, infinite in power, goodness, and wisdom, whose workmanship we are, and on whom we depend, and the idea of ourselves, as intelligent creatures, would, if duly considered, afford such foundations of our duty and rules of action, as might place morality among the sciences capable of demonstration.

As to the reasons why the mathematical sciences have been thought more capable of demonstration than the ideas of good and evil, right and wrong, &c. they are these. 1. That the former can be repre-

sented by sensible marks, as diagrams, which have a nearer correspondence with them than any words. 2. Moral ideas are commonly more complex than those of figures; whence it happens, that their names are of more uncertain signification; and besides, the mind cannot easily retain these precise combinations so perfectly, as is necessary in the examination of the agreements and disagreements of several of them one with another. See the article **KNOWLEDGE**.

One part of these disadvantages in moral ideas, continues the same great author, may in a good measure be remedied by accurate definitions; setting down that collection of simple ideas which every term shall stand for, and then using the term steadily for that precise collection. See the article **DEFINITION**.

MORANT POINT, the most easterly promontary of the island of Jamaica: west long. $76^{\circ} 30'$; north lat. 18° .

MORASSE, a low, moist land, which receives the waters from the higher grounds without having any descent to carry them off. See **MARSH** and **MOSS**.

MORAT, or **MURTEN**, a town of Switzerland, in the canton of Bern, situated on the lake Morat, fifteen miles west of Bern.

MORATUR, or **DEMORATUR**, in law, he demurs; a term used when one of the parties in a cause demurs, and does not proceed in pleading, but rests upon the judgment of the court in some particular point; either in relation to the sufficiency of the declaration, or the pleas of the contrary party; upon which the court, after taking some time to argue and advise, determine the point.

MORAVA, a river of european Turkey, that rises in the mountain of Rodope, or Argentum, and falls into the Danube at Semendria, to the eastward of Belgrade.

MORAVIA, a marquisate, or province in Bohemia, bounded by Silesia on the north-east, by Hungary and Austria on the south; and by Bohemia on the north-west.

MORAVIANS, a sect of protestants, who have been settled for a considerable time past at Hernhuth, in Germany, and have of late years spread themselves over most of our American colonies, as well as in several parts of England, where they are permitted to settle by a late act of parliament. They have a kind of church-government peculiar to themselves, and are commonly known by the name

name of *Unitas Fratrum*, or *The Brethren*. They profess the utmost veneration for our blessed Saviour, whom they consider as their immediate Head and Director, enjoin the most implicit obedience to the rulers of their church, and are said to practice much brotherly love amongst one another. In short, they seem to be a meek, peaceable, and industrious kind of people. They have nevertheless been lately accused of several erroneous principles and practices, to which accusations they have either been totally silent, or given partial and unsatisfactory answers: but as these may proceed more from the weakness and enthusiasm of particular members than the constitution of their church itself, they perhaps think themselves less obliged to take notice of them. It were to be wished, however, that they would publish such a plain and distinct account of their œconomy both in civil and religious matters, as might effectually clear them of all suspicion of aiming at any thing inconsistent with the principles of the purest professors of Christianity.

MORAW, a river that rises in the north of Moravia, and after dividing Austria from Hungary, falls into the Danube, to the westward of Presburg.

MORBACH, or **MURBACH**, a town of Germany, in the circle of the upper Rhine, and landgraviate of Alsatia, forty miles south of Strasburg, subject to France.

MORBID, among physicians, signifies diseased or corrupt, a term applied either to an unsound constitution, or to those parts or humours that are infected by a disease. See the article **DISEASE**.

MORBILLI, the measles, in medicine. See the article **MEASLES**.

MORBUS, **DISEASE**, in medicine. See the article **DISEASE**.

MORDELLA, in zoology, a genus of the coleoptera class of insects, the antennæ whereof are slender, and have the last joint globose; most of the species have also legs, which serve them for leaping.

MOREA, the antient Peloponnesus, is a province of european Turkey, and is a peninsula about one hundred and eighty miles long, and one hundred and thirty broad, bounded by the gulphs of Lepanto and Engia on the north; by the egean sea, or Archipelago, on the east; and by the Mediterranean on the south and west.

MORESK, or **MORISCO**, is a kind of

painting, carving, &c. done after the manner of the moors; consisting of several grotesque pieces and compartments, promiscuously mingled, not containing any perfect figure of a man, or other animal; but a wild resemblance of birds, beasts, trees, &c.

Moreisk-dances, vulgarly called **morricedances**, are those altogether in imitation of the moors, as sarabands, chacons, &c. which are generally performed with castanets or tambours.

MORETON, a market-town of Devonshire, twelve miles south-west of Exeter.

MORETON, is also a market-town of Gloucestershire, twenty miles north-east of Gloucester.

MORGAY, in ichthyology, the squalus with a variegated back, and with the belly fins concreted. See **SQUALUS**.

The head of this species is large, and of a depressed form; the eyes are large, and stand pretty high on the sides of the head; the nostrils are very conspicuous, they have each a double aperture; the mouth is on the under part of the rostrum, and opens transversely; the apertures of the gills are five, oblique, or nearly transverse openings on each side below the head, and reaching to the pectoral fins.

MORINA, in botany, a plant of the diandria-monogynia class, with a monopetalous flower, bilabiated at the limb: the seed is single, roundish, and coronated with the cup of the flower.

MORINDA, in botany, a genus of the pentandria-monogynia class of plants, with an infundibuliform monopetalous flower, divided into five segments at the limb: the fruit is a roundish berry, with an umbilicated point, and contains two elliptico-hemispherical seeds.

MORINELLUS, the **DOTTEREL**, in ornithology, a species of charadrius, with a ferrugineous breast, and a white ring round the neck. See **CHARADRIUS**.

MORISONA, a plant belonging to the polyandria-monogynia class, the flower of which consists of four oblong petals; and its fruit is a globose berry, containing a great many kidney-shaped seeds.

MORLACHIA, a province of Venice; having Dalmatia on the south, and lying between the provinces of Croatia and Bosnia.

MORLAIX, a port-town of France, in the province of Britany: west long. 4°, north lat. 48° 37'.

MORMYLUS, in ichthyology, the sparus

with the upper jaw longest, and with twelve parallel transverse black lines on each side. See the article SPARUS.

MORNING, the beginning of the day, the first appearance of light, or the time from midnight till noon.

MOROCCO, the capital of the kingdom of the same name in Africa; west long. 9° , north lat. 32° .

MOROCCO, *marroquin*, in commerce, a fine kind of leather, prepared of the skin of an animal of the goat kind, and imported from the Levant, Barbary, &c.

The name was probably taken from the kingdom of Morocco, whence the manner of preparing it was borrowed, which is this: the skins being first dried in the hair, are steeped in clear water three days and nights; then stretched on a tanner's horse, beaten with a large knife, and steeped afresh in water every day till they be well come: then they are thrown into a large vat in the ground full of water, where quick-lime has been flaked, and there lie fifteen days; whence they are taken, and again returned every night and morning. Then they are thrown into a fresh vat of lime and water, and shifted night and morning for fifteen days longer; then rinsed in clear water, and the hair taken off on the leg with the knife, returned into a third vat and shifted as before for eighteen days; steeped twelve hours in a river, taken out, rinsed, put in pails, where they are pounded with wooden pestles, changing the water twice; then laid on the horse, and the flesh taken off; returned into pails of new water, taken out, and the hair side scraped; returned into fresh pails, taken out, and thrown into a pail of a particular form, having holes at bottom; here they are beaten for the space of an hour, and fresh water poured on from time to time; then being stretched on the leg, and scraped on either side, they are returned into pails of fresh water, taken out, stretched and sewed up all round in manner of bags, leaving out the hinder legs as an aperture for the conveyance of a certain mixture.

The skins thus sewed are put in lukewarm water, where dogs excrements have been dissolved. Here they are stirred with long poles for half an hour, left at rest a dozen, taken out, rinsed in fresh water, and filled by a tunnel with a preparation of water and sumac, mixed and heated over the fire till ready to boil; and, as they are filled, the hind legs are sewed up to stop the passage. In this

state they are let down into the vessel of water and sumac, and kept stirring for four hours successively; taken out and heaped on one another; after a little time their sides are changed; and thus they continue an hour and a half, till drained. This done, they are loosened, and filled a second time with the same preparation, sewed up again, and kept stirring two hours, piled up, and drained as before. This process is again repeated, with this difference, that they are now stirred only a quarter of an hour; after which they are left till next morning, when they are taken out, drained on a rack, unsewed, the sumac taken out, folded in two from head to tail, the hair-side outwards, laid over each other on the leg, to perfect their draining, stretched out and dried; then trampled under foot by two and two, stretched on a wooden table, what flesh and sumac remains scraped off, the hair-side rubbed over with oil, and that again with water.

Then they are wrung with the hands, stretched, and pressed tight on the table with an iron-instrument like that of a currier, the flesh-side uppermost; then turned, and the hair-side rubbed strongly over with a handful of rushes, to squeeze out as much of the oil remaining as possible. The first course of black is now laid on the hair-side, by means of a lock of hair twisted and steeped in a kind of black dye, prepared of sour beer, wherein pieces of old rusty iron have been thrown. When half dried by hanging in the air, they are stretched on a table, rubbed over every way with a paumelle, or wooden-toothed instrument, to raise the grain, over which is past a light couche of water, then sleeked by rubbing them with rushes prepared for the purpose. Thus sleeked, they have a second couche of black, then dried, laid on the table, rubbed over with a paumelle of cork, to raise the grain again; and, after a light couche of water, sleeked over anew; and, to raise the grain a third time, a paumelle of wood is used.

After the hair-side has received all its preparations, the flesh-side is pared with a sharp knife for the purpose; the hair-side is strongly rubbed over with a woollen cap, having before given it a gloss with barberries, citron, or orange. The whole is finished by raising the grain lightly, for the last time, with the paumelle of cork; so that they are now fit for the market.

Manner of preparing red MOROCCO: after steeping, stretching, scraping, beating, and rinsing, as before, they are at length wrung, stretched on the leg, and passed after each other into water where alum has been dissolved. Thus alumed, they are left to drain till morning, then wrung out, pulled on the leg, and folded from head to tail, the flesh inwards.

In this state they receive their first dye, by passing them after one another into a red liquor, prepared with laque, and some other ingredients, which the maroquineers keep a secret. This they repeat again and again, till the skins have got their first colour; then they are rinsed in clear water, stretched on the leg, and left to drain twelve hours; thrown into water, into which white galls pulverized have been past through a sieve, and stirred incessantly for a day with long poles; taken out, hung on a bar a-cross the water all night, white against red, and red against white, and in the morning the water stirred up, and the skins returned into it for twenty-four hours.

MOROCHTHUS, in natural history, an indurated clay, called by us french-chalk; serving taylors and others to mark with. The antients esteemed it as an astringent, prescribing it in the colic, hæmorrhages, and other fluxes. See the article **LAPIS**.

MORON, a town of Spain, in the province of Andalusia, thirty miles south-east of Seville.

MORPETH, a borough-town of Northumberland, fourteen miles north of Newcastle, which sends two members to parliament.

MORPHEW, a leprous kind of scurf which sometimes breaks out upon the skin, particularly about the forehead. See the article **LEPROSY**.

MORSE, in zoology, a name by which some call the hippopotamus. See the article **HIPPOPOTAMUS**.

MORT D'ANCESTOR, in law. See the article **ASSISE of mort d'ancestor**.

MORTAIGN, a town of the Orleanois, in France: east long. 50', and north lat. 48° 40'.

MORTAIN, a town of Normandy, in France: west long. 50', and north lat. 48° 49'.

MORTALITY, or *bills of MORTALITY*, properly denote weekly lists of the persons who die in any place.

In London, these bills are drawn up by the company of parish clerks, and contain an account of the numbers, ages,

diseases, &c. of such as die within the bills of mortality; that is, in London, Westminster, and ten miles round.

The great disparity between the births and burials in London, is owing to this, that the dissenters of all sorts baptize their children without sending an account of them to the parish clerks; so that little dependance is to be had on these, with regard to calculating annuities for life.

Dr. Halley's table, grounded on the Breslau bills of Mortality, is of much more authority: it shews alternately the age, and the number of persons living of that age.

| Age. | Persons living. | Age. | Persons living. | Age. | Persons living. | Age. | Persons living. |
|------|-----------------|------|-----------------|------|-----------------|------|-----------------|
| 1 | 1000 | 22 | 586 | 43 | 417 | 64 | 202 |
| 2 | 851 | 23 | 579 | 44 | 407 | 65 | 192 |
| 3 | 798 | 24 | 573 | 45 | 397 | 66 | 182 |
| 4 | 760 | 25 | 567 | 46 | 387 | 67 | 172 |
| 5 | 732 | 26 | 560 | 47 | 377 | 68 | 162 |
| 6 | 710 | 27 | 553 | 48 | 367 | 69 | 152 |
| 7 | 692 | 28 | 546 | 49 | 357 | 70 | 142 |
| 8 | 680 | 29 | 539 | 50 | 346 | 71 | 131 |
| 9 | 670 | 30 | 531 | 51 | 335 | 72 | 120 |
| 10 | 661 | 31 | 523 | 52 | 324 | 73 | 109 |
| 11 | 653 | 32 | 515 | 53 | 313 | 74 | 98 |
| 12 | 646 | 33 | 507 | 54 | 302 | 75 | 88 |
| 13 | 640 | 34 | 499 | 55 | 292 | 76 | 78 |
| 14 | 634 | 35 | 490 | 56 | 282 | 77 | 68 |
| 15 | 628 | 36 | 481 | 57 | 272 | 78 | 58 |
| 16 | 622 | 37 | 472 | 58 | 262 | 79 | 49 |
| 17 | 616 | 38 | 463 | 59 | 252 | 80 | 4 |
| 18 | 610 | 39 | 454 | 60 | 242 | 81 | 34 |
| 19 | 604 | 40 | 445 | 61 | 232 | 82 | 28 |
| 20 | 598 | 41 | 436 | 62 | 222 | 83 | 23 |
| 21 | 592 | 42 | 427 | 63 | 212 | 84 | 20 |

By the help of this table, we can find what probability there is, that a man of a certain age, 30 for example, shall live 1, 2, 3, &c. years. Thus, against 30 we find 531, and underneath this 523, 515, &c. the meaning of which is, that out of 531 persons living at the age of 30, there remain only 523, 515, &c. who attain the age of 31, 32, &c. respectively.

Hence supposing A, B, C, &c. to represent, respectively, the persons living at a given age and the subsequent years; it is evident, that there being A persons living of the given year, and only B persons remaining after the first year, the probability that a person of the given

age shall live one year, is measured by the fraction $\frac{B}{A}$; and, in the same manner, the probability that he shall live two years, is measured by the fraction $\frac{C}{A}$, and so on. Thus the probability that a person of 30 years of age shall live one year, is measured by $\frac{523}{531}$; that is, he has the odds of 523 to 8, or nearly 65 to 1, that he does not die in a year. So, likewise, to find the odds that any person does not die before he attain any proposed age, the rule is this: subtract the number of the remaining persons of the age proposed, from those of the first age, and that will shew the odds there is of the person's living or dying; as for instance, the odds that a man of 40 shall live 7 years, is found by subtracting 377, the number of persons of 47 years from 445, the number of persons of 40 years, and the difference 68, is the number of persons dying in that 7 years: hence the odds is 377 to 68, or $5\frac{1}{2}$ to 1, that a man of 40 does live seven years; and the like for any other number of years.

From what has been said it appears, that the price of insurance upon lives ought to be regulated; there being a great difference between insuring the life of a man of 20, and that of another of 50 years of age; since it is 100 to 1 that the man of 20 dies not in a year; and but 38 to 1 for a man of 50 years of age. See the article LIFE.

MORTAR, a preparation of lime and sand mixt up with water, which serves as a cement, and is used by masons and bricklayers in building of walls of stone and brick.

The proportion of lime to sand in making mortar, ought to be according to the goodness or bairness of these materials, and is therefore rather to be regulated by the judgment of experienced workmen than by any stated proportion of materials. It is, however, necessary to observe, that the best sand for making lime, according to Wolfius, is that which is coarse and sharp, so as to prick the hands when rubbed, and yet not earthy, and so as to foul the water it is washed in: and that the best lime for the same purpose is that made of the hardest stones. See the article LIME.

Besides the common mortar used in laying stones, bricks, &c. there are several other kinds; as, 1. White mortar, used in

plastering walls and ceilings, which are often first plastered with loam, and is made of ox or cow-hair mixed and tempered with lime and water without any sand. The common allowance is one bushel of hair to six of lime; the hair binds the mortar, holds it fast together, and keeps it from cracking. 2. Mortar for furnaces, &c. is made with red clay wrought in water in which horse-dung and chimney-foot has been steeped, by which a salt is communicated to the water, which binds the clay, and makes it fit to endure the fire: this clay ought not to be too fat, lest it should be subject to crack; nor too lean or sandy, lest it should not bind enough. 3. Some workmen in metals, use a kind of mortar to plaster over the inside of the vessels in which they refine their metals, to keep them from running out: this kind of mortar is made with quick-lime and ox-blood, the lime being first beaten to powder and sifted, and afterwards mixed with the blood. 4. Mortar for sun-dials on walls, may be made of lime and sand tempered with linseed-oil, or, for want of the latter, with skimmed milk; but oil is better. This spread upon the wall will become as hard as stone, and will endure the weather six times as long as the ordinary plaster made of lime and hair with water. 5. For plastering the fronts of houses in imitation of brick-work, some use a mortar made of sharp sand and lime, powder of brick and some red ochre: and timber-houses, plastered over with this kind of mortar, look well though they have been done twenty or thirty years. 6. The mortar used in Italy for making water-courses and cisterns, and also in finishing or plastering of fronts is of two sorts; the one is composed of lime and hogs-grease, mixt with the juice of figs, and the other is of the same ingredients, but has liquid pitch added to the rest, and is first wet or slacked with wine, and then pounded or beaten with hogs grease and juice of figs. 7. An extraordinary good mortar for floors, walls, ceilings, &c. may be made with ox-blood and fine clay tempered together. 8. And in buildings, one part of waste soap-ashes, mixed with another of lime and sand, make a very durable mortar.

MORTAR-PIECE, a short piece of ordnance, considerably thick and wide; serving to throw bombs, carcasses, fire-pots, &c. See plate of gunnery, fig. 4. which

4. which represents a mortar mounted on its carriage.

The use of mortars is thought to be older than that of cannon; they being employed in the wars in Italy to throw stones and balls of red-hot iron, long before the invention of bombs; which, as Blondel informs us, were first thrown at the siege of Wachtendorch, in Guilderland, in 1588.

It was formerly the opinion of gunners, that only one certain charge of powder was requisite for each mortar, and that the horizontal range could not be altered but by changing the direction of the piece; but, at present, when a place lying in the same horizontal plane with the mortar, is to be bombarded, they elevate the piece to 45° , and augment or diminish the charge of powder until they can hit the mark. The following advantages introduced this practice: 1.

The public powder is saved as much as possible; because, at a direction of 45° , a less velocity, and consequently a less charge of powder is required to make any horizontal range, than is necessary to make the same horizontal range at any other elevation. 2. In elevating mortars to their proper directions, gunners seldom come within a degree or two of the proposed elevation, both on account of the imperfection of the instruments which they generally use for that purpose, and the hurry they are in at that time. And in bombarding towns from ships, it is scarce possible to come within two degrees of the designed elevation, because of the agitation of the vessel, which continually changes the direction of the mortar. But by raising the mortar to 45° , the bad consequences of this inaccuracy of elevation are in a great measure prevented, because a small error above or below 45° , occasions a very inconsiderable error of amplitude.

For the same reasons, also, places lying above or below the horizontal plane, passing through the piece, are bombarded by directing the mortar so as its axis may bisect the angle comprehended between a perpendicular to the horizon, at the point of projection, and a line drawn from that point to the mark aimed at; and then augmenting and diminishing the charge of powder until the object be hit.

When the business, therefore, can be effectually done by this middle elevation, it ought certainly to be preferred to any

other. However, in the course of a siege it frequently happens, that several of the cases mentioned under the article GUNNERY, are made use of either by the assailants or defendants. Whence we may infer, that though mortars are ofteneft, and most fitly, used at 45° elevation, yet they ought not to be founded of one piece with their bed, because such are not only very costly but unweildy, and therefore unfit to be raised to any desired elevation. See GUNNERY. Mortars are most fit for service when hung by trunnions and propped with quoins, especially if their carriages be steady enough to prevent the effects of sudden recoiling.

In shooting with mortars, the following general rules should be always observed. 1. To measure the distance of the object aimed at. 2. That the bombs be of equal weight, otherwise the shots will vary. 3. That the carriage be on an exact level, to prevent its leaping. 4. That the powder with which the piece is charged, be always of the same strength and quantity. 5. That the charge be always equally rammed down. 6. That the wads be always of wood, tampions, or oakum. 7. That the fuses be fresh made the days on which they are to be used; and that they be of a composition proportionable to the range of the shot in the air, so that the bomb may break at the very moment of, or soon after its fall; which composition must be such as not to be extinguished though it fall in water, but continue burning till the bomb breaks. See the article BOMB.

MORTARO, or MONTARA, a town of the dutchy of Milan, in Italy, twenty miles north-east of Casal, and subject to the king of Sardinia.

MORTGAGE, in law, a pledge or pawn of lands, tenements, &c. for money borrowed; so called because if the money is not paid at the day, the land dies to the debtor, and is forfeited to the creditor. The common method of making a mortgage, is by lease for a long term of years, wherein a pepper-corn rent has been usually reserved: or it may be made by assignment for a term, and by lease and release. The creditor, who holds the estate according to the condition of the deed, is called the mortgagee; but the mortgager, who is the person that makes the mortgage, generally keeps possession of the land till failure is made in the payment of the mortgage-money;

money; in which case, though the mortgagee enters for non-payment, the mortgager has a right to the equity of redemption in the court of chancery, where he may call the mortgagee to an account for the profits of the land mortgaged.

In a mortgage is contained a proviso or covenant, that in case the money be paid on the day limited, the deed shall thereupon be void; but on the mortgager's paying the interest of the money, mortgages are frequently continued without disturbing the possession. Where an old mortgage is assigned to another, it is to be taken for a new one from the time of the assignment; and as a mortgagee, where the mortgage is forfeited, is allowed interest for his interest, so an assignee is to have it for all interest due at the time of the assignment, which must be accounted as principal whenever he comes to redeem the land; but yet an agreement made at the same time with the original mortgager, will not make future interest to be principal before any is become due. It has also been decreed, that where a mortgagee lends more money on bond to the mortgager, the latter shall not be permitted to redeem, except he pay the money lent upon the bond, together with that on the mortgage; though if the mortgager mortgage the equity of redemption to another, the second mortgagee will not be affected by this bond; for this reason, because it is but a personal charge on the mortgager. By a late statute it is ordained, that when any action of ejectment is brought by a mortgagee, for the recovery of the possession of the lands or tenements, &c. mortgaged, and there is no suit in equity for foreclosing or redeeming the equity of redemption, in case the person intitled to redeem shall, pendente lite, or pending the action, bring all the principal and interest due, with costs, into court, it shall be taken as a full satisfaction and discharge of the mortgage, and the mortgagee shall thereon be obliged to reconvey the land, &c. and deliver up all deeds, &c. 7 Geo. 2. c. 201.

MORTIER, an ensign of dignity, borne by the chancellor, and grand presidents of the parliaments of France. That borne by the chancellor, is a piece of cloth of gold, edged and turned up with ermine; and that of the first president is a piece of black velvet edged with a double row of gold lace, while

that of the other presidents is only edged with a single row. This they formerly carried on their heads, as they do still in grand ceremonies, such as the entry of the king: but, ordinarily, they carry them in the hand.

MORTIFICATION, in medicine, the same with sphacelus. See SPHACELUS.

MORTISE, or **MORTOISE**, in carpentry, &c. a kind of joint, wherein a hole of a certain depth is made in a piece of timber, which is to receive another piece called a tenon.

MORTMAIN, in law, is the alienation of lands or tenements to any religious house, corporation, or fraternity, and their successors. Lands alienated in mortmain are different from others, for they never revert to the donor, or to any temporal or common use; on which account the lords by such alienation lose their escheats, and many services that were formerly due to them; as bodies politic never die, nor can perform personal service, commit treason, felony, or the like. By the statute of mortmain lately made, it is enacted, that no manors, lands, &c. shall be given or granted to, or settled upon any persons, bodies politic, &c. for any estate whatsoever, or charged in trust for charitable uses, unless it be done by deed indented and sealed twelve months at least before the donor's death, and inrolled in chancery within six months after executed. The two Universities, and the colleges of Eaton, Westminster, &c. are excepted out of this act. 9 Geo. II. c. 36.

MORTUARY, in the ecclesiastical law, is a gift left by a man at his death to his parish church, in recompence of personal tythes omitted to be paid in his lifetime; or it is that beast, or other cattle, which, after the death of the owner, by the custom of the place, is due to the parson or vicar, in lieu of tithes or offerings forgot, or not well and truly paid by him that is dead.

A mortuary is not properly due to an ecclesiastical incumbent from any but those of his own parish: but by custom, in some places, it is paid to the incumbents of other parishes, when a corpse is carried through them. The bishops of Bangor, Landaff, St. David's, &c. had formerly mortuaries of priests: and it was customary in the diocese of Chester, for the bishop to have a mortuary, on the death of every priest dying within the archdeaconry of Chester, of his best beast, saddle,

saddle, and bridle, with his best cloak, hat, and upper garment under the gown. Mortuaries are not now paid in kind; but money is to be given in lieu of them. By a statute of Hen. VIII. they are to be paid as follows: he that dies possessed of moveable goods to the value of 40l. or above, is to pay 10s. he that dies possessed of goods of 30l. value, and under 40l. is to pay 6s. 8d. and so on in proportion: but if the goods are under the value of 6l. 13s. 4d. after the deceased's debts are paid, no mortuary is to be demanded. It is to be observed, that no mortuaries are to be paid, except in those places where they are due by custom.

MORTUUM CAPUT. See the article **CAPUT MORTUUM**.

MORVIEDRO, or **MURVIEDRO**, a town of Spain, in the province of Valencia, eighteen miles north of the city of Valencia.

MORUS, the **MULBERRY TREE**, in botany, &c. See **MULBERRY**.

MOSAIC, or **MOSAIC-WORK**, an assemblage of little pieces of glass, marble, precious stones, &c. of various colours, cut square, and cemented on a ground of stucco, in such a manner as to imitate the colours and degradations of painting.

Method of performing MOSAIC-WORK of glass is this: they provide little pieces of glass, of as many different colours and sizes as possible. See the article *Painting in GLASS*.

Now in order to apply these several pieces, and out of them to form a picture, they in the first place procure a cartoon or design to be drawn; this is transferred to the ground or plaster by calking, as in painting in fresco. See the article **FRESCO**.

As this plaster is to be laid thick on the wall, and therefore will continue fresh and soft a considerable time, so that there may be enough prepared at once, to serve for as much work as will take up three or four days.

This plaster is composed of lime, made of hard stone, with brick-dust very fine, gum tragacanth, and whites of eggs: when this plaster has been thus prepared and laid on the wall, and made the design of what is to be represented; they take out the little pieces of glass with a pair of piers, and range them one after another, still keeping strictly to the light, shadow, different tints and

colours represented in the design before; pressing or flattening them down with a ruler, which serves both to sink them within the ground, and to render the surface even.

Thus in a long time, and with a great deal of labour, they finish the work, which is still the more beautiful, as the pieces of glass are more uniform, and ranged at an even height.

Some of these pieces of mosaic-work are performed with that exactness, that they appear as smooth as a table of marble, and as finished and masterly as a painting in fresco; with this advantage, that they have a fine lustre, and will last ages.

The finest works of this kind that have remained till our time, and those by whom the moderns have retrieved the art, which was in a manner lost, are those in the church of St. Agnes, formerly the temple of Bacchus at Rome; and some at Pisa, Florence, and other cities of Italy. The most esteemed among the works of the moderns are those of Joseph Pine, and the chevalier Lanfranc in the church of St. Peter at Rome: there are also very good ones at Venice.

Method of performing MOSAIC-WORK of marble and precious stones is this: the ground of mosaic-works, wholly marble, is usually a massive marble, either white or black. On this ground the design is cut with a chisel, after it has been first calqued. After it has been cut of a considerable depth, i. e. an inch or more, the cavities are filled up with marble of a proper colour, first fashioned according to the design, and reduced to the thickness of the indentures with various instruments. To make the pieces thus inserted into the indentures cleave fast, whose several colours are to imitate those of the design, they use a stucco, composed of lime and marble-dust; or a kind of mastic, which is prepared by each workman, after a different manner peculiar to himself.

The figures being marked out, the painter or sculptor himself draws with a pencil the colours of the figures, not determined by the ground, and in the same manner makes strokes or hatchings in the place, where shadows are to be; and after he has engraven with the chisel all the strokes thus drawn, he fills them up with a black mastic, composed partly of burgundy-pitch poured on hot; taking off afterwards what is superfluous, with a piece of soft stone or brick, which, together

gether with water and beaten cement, takes away the mastic, polishes the marble, and renders the whole so even that one would imagine it only consisted of one piece.

This is the kind of mosaic-work, that is seen in the pompous church of the invalids at Paris, and the fine chapel at Versailles, with which some intire apartments of that palace are incrustated.

As for mosaic-work of precious stones, other and finer instruments are required than those used in marble; as drills, wheels, &c. used by lapidaries and engravers on stone. As none but the richest marbles and stones enter this work, to make them go the further, they are sawn into the thinnest leaves imaginable, scarce exceeding half a line in thickness; the block to be sawn is fastened firmly with cords on the bench, and only raised a little on a piece of wood, one or two inches high. Two iron-pins, which are on one side the block, and which serve to fasten it, are put into a vice contrived for the purpose, and with a kind of saw or bow, made of fine brass-wire, bent on a piece of spongy wood, together with emery steeped in water, the leaf is gradually fashioned by following the stroke of the design, made on paper, and glued on the piece. When there are pieces enough fastened to form an intire flower, or some other part of the design, they are applied to the ground.

The ground which supports this mosaic-work is usually of free-stone. The matter with which the stones are joined together, is a mastic, or kind of stucco, laid very thin on the leaves as they are fashioned; and this being done the leaves are applied with plyers.

If any contour, or side of a leaf, be not either squared or rounded sufficiently, so as to fit the place exactly, into which it is to be inserted, when it is too large, it is to be brought down with a brass-file or rasp; and if it be too little, it is managed with a drill and other instruments used by lapidaries.

Mosaic-work of marble is used in large works as in pavements of churches, basilics, and palaces; and in the incrustation and vaneering of the walls of the same edifices.

As for that of precious stones, it is only used in small works, as ornaments for altar-pieces, tables for rich cabinets, precious stones being so very dear.

Manner of performing MOSAIC-WORK of

gypsum. Of this stone calcined in a kiln, and beaten in a mortar, and sifted, the french workmen make a sort of artificial marbles, imitating precious stones, and of these they compose a kind of mosaic-work, which does not come far short, either of the durableness or the vivacity of the natural stones; and which besides has this advantage, that it admits of continued pieces or paintings of intire compartments without any visible joining.

Some make the ground of plaster of Paris, others of free-stone. If it be of plaster of Paris, they spread it in a wooden frame, of the length and breadth of the work intended, and in thickness about an inch and a half. This frame is so contrived, that the tenons being only joined to the mortises by single pins, they may be taken asunder, and the frame be dismounted, when the plaster is dry. The frame is covered on one side with a strong linen-cloth, nailed all round, which being placed horizontally with the linen at the bottom, is filled with plaster passed through a wide sieve. When the plaster is half dry, the frame is set up perpendicularly, and left till it is quite dry; then it is taken out, by taking the frame to pieces.

In this mosaic, the ground is the most important part. Now in order to the preparation of this sifted gypsum, which is to be applied on this ground, it is dissolved and boiled in the best english glue, and mixt with the colour that it is to be of, then the whole is worked up together into the usual consistence of plaster; and then is taken and spread on the ground five or six inches thick. If the work be such, as that mouldings are required, they are formed with gouges and other instruments.

It is on this plaster, thus coloured like marble or precious stone, and which is to serve as a ground to a work, either of lapis, agate, alabaster, or the like, that the design to be represented is drawn; having been first pounced or calqued. To hollow or impress the design, they use the same instruments that sculptors do; the ground whereon they are to work not being much less hard than the marble itself. The cavities being thus made in the ground, are filled up with the same gypsum boiled in glue, only differently coloured, and thus are the different colours of the original represented. In order that the necessary colours and tints may

may be ready at hand, the quantities of the gypsum are tempered with the several colours in pots.

After the design has been thus filled and rendered visible, by half polishing it with brick and soft stone, they go over it again, cutting such plates as are either to be weaker or more shadowed, and filling them with gypsum; which work they repeat, 'till all the colours being added one after the other, represent the original to the life.

When the work is finished, they scour it with soft stone, sand, and water; after that, with a pumice-stone; and in the last place polish it with a wooden mullet and emery. Then, lastly, they give it a lustre, by smearing it over with oil, and rubbing it a long time with the palm of the hand, which gives it a lustre, no ways inferior to that of natural marble. If you would only make a variegated table, or other work, of several colours, without mosaic figures, the process is somewhat different.

In this case, you are to prepare colours separately in bowls, as many as nature shews in the marble to be imitated; and after you have incorporated them with gypsum and glue-water, take a trowel full of each, and dispose them in a trough, without any order, then without mingling them, and only by cutting or crossing the gypsum of each trowel, once with each of the rest, they give them that beautiful confusion, which renders natural marble valuable. Of these you may make tables, or lay them in a mould according to the work to be done.

Mosaic work of wood is more properly called marquetry. See MARQUETRY.

MOSAMBIQUE, the capital of a province of the same name in Zanguebar, in Africa, situated on an island at the mouth of the river Mosambique: east long. 40°, south lat. 15°.

MOSBACH, or MORSBACH, a town of Germany, in the palatinate of the Rhine, sixteen miles east of Heidelberg.

MOSCHUS, the MUSK-ANIMAL, a genus of quadrupeds of the order of the pecora, having no horns; the canine teeth of the upper jaw are exerted. Of this genus there is only one known species, which is the animal that produces the perfume from which it is named. See the article MUSK.

This creature when full grown is three feet in length, from the tip of the nose to

the rump; the head is oblong, and the anterior part much like the greyhound; the ears are large and erect, they resemble those of the rabbit, and are equal in length to the diameter of the forehead; the tail is not more than two inches in length, and the creature always carries it erect; the body is tolerably fleshy, and rounded; the legs about a foot in length, and very robust; the feet deeply divided, each into two claws in the anterior part, and as many heels behind. The fur on the head and that on the legs is about half an inch long, that on the belly is an inch and a half, and that which grows on the back three inches; these hairs are thicker than in any other known animal, and are variegated, from the base to the extremity, with distinct spaces of brown and white: the vessel or bag in which the perfume called musk is contained, is three inches long and two broad, and hangs under the belly, protuberating near three quarters of an inch beyond the surface.

MOSCOW, the capital of the province of the same name in Muscovy, situated on the river Moscowa, 360 miles south-east of Petersburg: east long. 38°, north lat. 55° 45'.

MOSCOWA, a river which rises in the west part of the province of Muscovy, and falls into the river Ocka at Kolomna.

MOSELLE, a river of Germany, which rises in the mountains of Vauge, in Lorraine, and running through that duchy and the electorate of Triers, falls into the Rhine at Coblentz.

MOSKITO, a country of North America, situated between 85° and 88° of west longitude, and between 13° and 15° of north latitude; having the north-sea, on the north and east; Nicaragua, on the south; and Honduras on the west.

MOSPURG, or MOSBURG, a town of Germany, in the circle of Bavaria, situated at the confluence of the rivers Iser and Amburg, thirty miles north-east of Munich.

MOSQUE, a temple, or place of religious worship, among the mahometans.

All mosques are square buildings, generally built with stone; before the chief gate there is a square court, paved with white marble, and low galleries round it, whose roof is supported by marble pillars. In these galleries the Turks wash themselves before they go into the mosque. In each mosque there is a great number of lamps; and between

tween these, hang many crystal rings, ostriches eggs, and other curiosities, which, when the lamps are lighted, make a fine shew. As it is not lawful to enter the mosques with shoes or stocking on, the pavements are covered with pieces of stuff sewed together, each being wide enough to hold a row of men kneeling, sitting, or prostrate. The women are not allowed to enter the mosque, but stay in the porches without. About every mosque there are six high towers, called minarets, each of which has three little open galleries, one above another: these towers, as well as the mosques, are covered with lead, and adorned with gilding and other ornaments; and from thence, instead of a bell, the people are called to prayer by certain officers appointed for that purpose. Most of the mosques have a kind of hospital belonging to them, in which travellers, of what religion soever, are entertained during three days. Each mosque has also a place called Tarbé, which is the burying-place of its founders: within which is a tomb six or seven feet long, covered with green velvet or sattin, at the ends of which are two tapers, and round it several seats, for those who read the koran, and pray for the souls of the deceased.

MOSS, *muscus*, in botany, a very numerous order of plants, belonging to the cryptogamia class, the fructification of which is but little understood. Linnæus, indeed, has attempted to arrange them according to what he takes to be the parts of generation, many of which he acknowledges to be wanting. Hence in the description of such imperfect plants, it becomes necessary to distinguish them according to their general habit and structure.

Mosses, therefore, may be arranged under the following subdivisions, 1. Such as consist of tender flexible filaments, as byssus and conferva. 2. Such as consist of a mere foliaceous or gelatinous matter, as phyllona, ulva, &c. 3. Such as consist of firm and somewhat rigid stalks, as usnea, platysma, &c. 4. Such as consist merely of a dry, crustaceous, or else of a gelatinous matter, as placodium. 5. Such as produce capsules, covered with opercula, as bryum, polytrichum, sphagnum, minium, &c. 6. Such as produce capsules without pedicles, and without calyptræ, as lycopodium, trispermium, selago, &c. 7. Such as con-

sist of foliaceous matter, with evident fructifications arising from it, as marchantia, jungermannia, anthoceros, &c. See BYSSUS, CONFERVA, &c.

Mosses are of considerable use in medicine; usnea is esteemed a good desiccative and astringent; the cup-moss is recommended in the chin-cough; the grey ground-lichen, or liverwort, against the bite of a mad-dog; and other species, in other disorders, as mentioned under their respective heads.

Moss is frequently very injurious to fruit-trees, which grow upon cold barren soils, or where they are so close planted as to exclude the free access of the air: the only remedy, in such cases, is to cut down part of the trees, and to plough up the ground between those left remaining; and in the spring-season, in moist weather, you should with an iron-instrument made a little hollow, the better to surround the branches of the trees, scrape off the moss, carrying it off the place; and by two or three times thus cleansing them, together with carefully stirring the ground, it may be entirely destroyed from the trees; but unless part of the trees are cut down, and the ground be well stirred, the rubbish of the moss will signify little.

If the trees are covered with moss, on account of the dryness of the ground, the proper remedy is to lay mud, from the bottom of a river or pond, pretty thick about their roots.

Moss is also a name given to boggy grounds in many parts of the kingdom. These consist of a turfy surface, below which is a black, moist, spongy earth, which being dug up with spades somewhat in the form of bricks, and dried, is what they call peats, used as fuel in several parts; and the upper scurf, being cut and dried, makes turfs, another coarser sort of fuel.

Wall-Moss, *bryum*, in botany. See the article BRYUM.

MOSTRA, in the italian music, a mark at the end of a line or space, to shew that the first note of the next line is in that place: and if this note be accompanied with a sharp or flat, it is proper to place these characters along with the mostra. Also if in a thorough-bass this first note have any cyphers, these cyphers should be put along with the mostra, at the end of the preceding staff. And, lastly, if the part change its cleff with the first note, the cleff ought to be marked

ed along with the *mostra*, in the same manner.

The *mostra* is of considerable use, especially in quick motions, as it prepares the player for what is to follow.

MOSUL, or MOUSUL. See MOUSUL.

MOTACILLA, in ornithology, a numerous genus of birds, of the order of the *passeres*, distinguished by a straight beak, of a subulated figure, and a lacerated tongue.

To this genus belong the common wag-tail, the wheat-ear, nightingale, red-start, wren, &c. See the articles WAG-TAIL, WHEAT-EAR, &c.

MOTAZALITES, the name of a famous sect among the mahometans, properly signifying separatists.

The motazalites are not accounted orthodox muslimen, as they believe the al-koran to be created and not eternal; and besides assert, that there are no attributes in God distinct from his essence.

MOTE, in law-books, signifies court or convention, as a ward-mote, burgh-mote, swain-mote, &c. See the article WARD-MOTE, &c.

MOTETTO, in the italian music, a sort of church-music composed with much art and ingenuity, from one to eight parts, with or without instruments, and usually accompanied with a thorough-bass.

MOTH, *tinea*, or *phalæna*, in zoology. See the article PHALÆNA.

MOTHER, *mater*, a term of relation, denoting a woman who hath born a child. See the article DELIVERY.

The queen mother, is the same with what we call queen dowager. See QUEEN.

MOTHER is also used figuratively, to denote whatever gives origin to other things of the same kind: thus we say a mother-church, a mother-tongue or language, &c. See the articles CHURCH and LANGUAGE.

Fits of the MOTHER, in medicine, the same with what is otherwise called hysterics. See the article HYSTERIC.

MOTION, is defined to be the continued and successive change of place. See the article COMMUNICATION of Motion.

There are three general laws of motion.

1. That a body always perseveres in its state of rest, or of uniform motion in a right line, till by some external force it be made to change its state: for as body is passive in receiving its motion, and the direction of its motion, so it retains them, or perseveres in them without any change, till it be acted on by

something external. From this law it appears, why we inquire not, in philosophy, concerning the cause of the continuation of motion or rest in bodies, which can be no other than their inertia; but if a motion begin, or if a motion already produced is either accelerated or retarded, or if the direction of the motion is altered, an inquiry into the power or cause that produces this change is a proper subject of philosophy. 2. The

second general law of motion is, that the change of motion is proportional to the force impressed, and is produced in the right line in which that force acts.

When a fluid acts upon a body, as water or air upon the vanes of a mill, or wind upon the sails of a ship, the acceleration of the motion is not proportional to the whole force of those fluids, but to that part only which is impressed upon the vanes or sails, which depends upon the excess of the velocity of the fluid above the velocity which the vane or sail has already acquired: for if the velocity of the fluid be only equal to that of the vane or sail, it just keeps up with it, but has no effect either to advance or retard its motion. Regard must always be had

to the direction in which the force is impressed, in order to determine the change of motion produced by it: thus, when the wind acts obliquely with respect to the direction of a ship, the change of her motion is first to be estimated in the direction of the force impressed; and thence, by a proper application of mechanical and geometrical principles, the change of the motion of the ship in her own direction is to be deduced. 3. The

third general law of motion is, that action and re-action is equal, with opposite directions, and are to be estimated always in the same right line. Body not only never changes its state of itself, but resists by its inertia every action that produces a change in its motion: hence when two bodies meet, each endeavours to persevere in its state, and resists any change; the one acquires no new motion, but what the other loses in the same direction; nor does this last lose any force, but what the other acquires; and hence, though by their collision, motion passes from the one to the other, yet the sum of their motions, estimated in a given direction, is preserved the same, and is unalterable by their mutual actions upon each other.

All motion may be considered absolutely

or relatively. Absolute or real motion, says Mr. Maclaurin, is when a body changes its place in absolute space; and relative motion, is when a body changes its place only with relation to other bodies.

From the observation of nature, every one knows that there is motion; that a body in motion perseveres in that state, till by the action of some power it is necessitated to change it; that it is not in relative or apparent motion in which it perseveres, in consequence of its inertia, but in real or absolute motion. Thus the apparent diurnal motion of the sun and stars would cease, without the least power or force acting upon them, if the motion of the earth was stopt; and if the apparent motion of any star was destroyed by a contrary motion impressed upon it, the other celestial bodies would still appear to persevere in their course. See the article INERTIA.

To make this matter still plainer, Mr. Martin observes, that space is nothing but an absolute and infinite void, and that the place of a body is that part of the immense void which it takes up or possesses: and this place may be considered absolutely, or in itself, in which case it is called the absolute place of the body; or else with regard to the place of some other body, and then it is called the relative or apparent place of the body.

Now as a motion is only the change of place in bodies, it is evident that it will come under the same distinction of absolute and relative or apparent. All motion is in itself absolute, or the change of absolute space; but, when the motions of bodies are considered and compared with each other, then are they relative and apparent only: they are relative, as they are compared to each other; and they are apparent only, inasmuch that not their true or absolute motion, but the sum or difference of the motions only is perceivable to us.

In comparing the motions of bodies we may consider them as moving both the same way, or towards contrary parts: in the first case, the difference of motion is only perceived by us; in the latter, the sum of the motions. Thus, for example, suppose two ships, A and B, set sail from the same port upon the same rhumb, and that A sails at the rate of five miles per hour, and B at the rate of three: here the difference of the velocity (*viz.*

two miles per hour) is that by which the ship A will appear to go from the ship B forwards, or the ship B will appear at A to go with the same velocity backwards, to a spectator in either respectively.

If the two ships, A and B, move with the same degree of velocity, then will the difference be nothing, and so neither ship will appear to the other to move at all. Hence it is, that though the earth is continually revolving about its axis, yet, as all objects on its surface partake of the same common motion, they appear not to move at all, but are relatively at rest.

If two ships, A and B, with the degrees of velocity as above, meet each other, the one will appear to the other to move with the sum of both velocities, *viz.* at the rate of eight miles per hour; so that in this case the apparent motion exceeds the true, as in the other it fell short of it. Hence the reason why a person, riding against the wind, finds the force of it much greater than it really is, whereas, if he rides with it, he finds it less.

The reason of all these phenomena of motion will be evident, if we consider we must be absolutely at rest, if we would discern the true or real motions of bodies about us. Thus a person on the strand will observe the ships sailing with their real velocity; a person standing still will experience the true strength and velocity of the wind; and a person, placed in the regions between the planets, will view all their true motions, which he cannot otherwise do, because in all other cases the spectator's own motion must be added to or subtracted from that of the moving body, and the sum or difference is therefore the apparent or relative motion, and not the true.

Motion is also either equable or accelerated.

Equable motion is that by which a body passes over equal spaces in equal times.

Accelerated motion is that which is continually augmented or increased, as retarded motion is that which continually decreases; and, if the increase or decrease of motion be equal in equal times, the motion is then said to be equally accelerated or retarded.

Equable motion is generated by a single impetus or stroke; thus the motion of a ball from a cannon is produced by the single action of the powder in the first moment, and, therefore, the velocity it first sets out with, would always continue the same, were it void of gravity; and

and to move in an unresisting medium ; which, therefore, would be always equable, or such as would carry it through the same length of space in every equal part of time.

Hence we may determine the theorems for the expressions of the time (T) the velocity (V) and the space (S) passed over in equable or uniform motion very easily thus :

If the time be given, or the same, the space passed over will be as the velocity, *viz.* $S : V$; that is, with twice the velocity, twice the space ; with three times the velocity, three times the space, will be passed over in the same time, and so on.

If the velocity be given, or remain the same, then the space passed over will be as the time, *viz.* $S : T$; that is, it will be greater or less, as the time is so.

But if neither the time nor velocity be given or known, then will the space be in the compound ratio of both, *viz.* $S : T V$. Hence, in general, since $S : T V$,

we have $V : \frac{S}{T}$; that is, the velocity is always directly as the space, and inversely as the time. And also $T : \frac{S}{V}$; that is, the

time is as the space directly, and as the velocity inversely ; or, in other words, it increases with the space, and decreases with the velocity.

If, therefore, in any rectangle, one side represent the time, and the other side the velocity, it is evident that the area of the said rectangle will represent the space passed over by an uniform motion in that time, and with that velocity.

Accelerated motion is produced by a constant impulse of power which keeps continually acting upon the body, as that of gravity which produces the motion of falling bodies ; which sort of motion is constantly accelerated, because gravity every moment adds a new impulse, which generates a new degree of velocity ; and, the velocity thus increasing, the motion must be quickened each moment, or fall faster and faster, the lower it falls.

In like manner a body thrown perpendicularly upward, as a ball from a cannon, will have its motion continually retarded, because gravity acts constantly upon it in a direction contrary to that given it by the powder ; so that its velocity upwards must be continually diminished, and so its motion as continually

retarded, till at last it be all destroyed. The body has then attained its utmost height, and is for a moment motionless, after which it begins to descend with a velocity in the same manner accelerated, till it comes to the earth's surface. See the article ACCELERATION.

Since the momentum (M) of a body is compounded of the quantity of matter (Q), and the velocity (V), we have this general expression $M = Q V$, for the force of any body A ; and suppose the force of another body B be represented by the same letters in italics, *viz.* $M = Q V$.

Let the two bodies A and B in motion impinge on each other directly ; if they tend both the same way, the sum of their motions towards the same part will be $Q V + Q V$. But if they tend towards contrary parts, or meet, then the sum of their motions towards the same part will be $Q V - Q V$; for since the motion of one of the bodies is contrary to what it was before, it must be connected by a contrary sign. Or thus ; because, when the motion of B conspires with that of A, it is added to it ; so, when it is contrary, it is subducted from it, and the sum or difference of the absolute motions is the whole relative motion, or that which is made towards the same part. Again, this total motion towards the same parts, is the same both before and after the stroke, in case the two bodies A and B, impinge on each other ; because, whatever change or motion is made in one of those bodies by the stroke, the same is produced in the other body towards the same part ; that is, as much as the motion of B is increased or decreased towards the same part by the action of A, just so much is the motion of A diminished or augmented towards the same part by the equal re-action of B, by the third law of motion.

In bodies not elastic, let x be the velocity of the bodies after the stroke (for, since we suppose them not elastic, there can be nothing to separate them after collision ; they must therefore both go on together, or with the same celerity). Then the sum of the motions after collision will be $Q x + Q x$; whence, if the bodies tend the same way, we have $Q V + Q V = Q x + Q x$, or if they meet, $Q V - Q V = Q x + Q x$, and accordingly $\frac{Q V + Q V}{Q + Q} = x$, or $\frac{Q V - Q V}{Q + Q} = x$.

If

If the body (B) (plate CI. XXXIII. fig. 1. n° 1.) be at rest, then $V = 0$, and the velocities of the bodies after the stroke

$$\text{will be } \frac{QV}{Q+Q} = x.$$

Thus if the bodies be equal (*viz.* $Q = Q$, *ibid.* n° 1.) and A with 10 degrees of velocity impinge on B at rest; then

$$\frac{QV}{Q+Q} = \frac{10}{2} = 5 = x. \text{ If } Q = Q, \text{ and } V:V::10:6 \text{ (ib. n° 2.) we have } \frac{QV+QV}{Q+Q} = \frac{16}{2} =$$

$$8 = x, \text{ the velocity after the stroke.}$$

If the bodies are both in motion, and tend the contrary way; then when $Q = Q$

(*ibid.* n° 3.) and $V = V$, it is plain

$$\frac{QV-QV}{Q+Q} = 0 = x; \text{ that is, the bodies}$$

which meet with equal bulks and velocities, will destroy each other's motion after the stroke, and remain at rest. If

$Q = Q$ (*ibid.* n° 4.) but $V:V::6:14$,

$$\text{then } \frac{QV-QV}{Q+Q} = \frac{8}{2} = -4 = x; \text{ which}$$

shews that equal bodies meeting with unequal velocities, they will, after the stroke, both go on the same way which the most prevalent body moved before.

If the velocity $\frac{QV \pm QV}{Q+Q}$ be multiplied by

the quantities of matter Q and Q , we

shall have $\frac{Q^2V \pm Q^2V}{Q+Q} =$ the momen-

tum of A after the stroke; and

$\frac{QVQ \pm Q^2V}{Q+Q} =$ the momentum B: there-

$$\text{fore } QV - \frac{Q^2V \pm Q^2V}{Q+Q} = \frac{Q^2V \pm Q^2V}{Q+Q}$$

$$= \frac{Q^2}{Q+Q} \times V \pm V = \text{the quantity of the}$$

motion lost in A after the stroke, and consequently is equal to what is gained in B, as may be shewn in the same manner.

But since a part of this expression (*viz.*

$$\frac{Q^2}{Q+Q}) \text{ is constant, the loss of mo-}$$

tion will ever be proportional to the other part $V \pm V$. But this loss or change of motion in either body is the whole effect, and so measures the magnitude or energy of the stroke. Wherefore any two bodies, not elastic, strike each other with a stroke always proportionable to the sum of their velocities ($V+V$) if they meet, or to the differ-

ence of their velocities ($V-V$) if they tend the same way.

Hence, if one body (B) be at rest before the stroke, then $V = 0$; and the magnitude of the stroke will be as V ; that is, as the velocity of the moving body A; and not as the square of its velocity, as many philosophers, (*viz.* the Dutch and Italians) maintain.

In bodies perfectly elastic, the restituent power or spring by which the parts displaced by the stroke restore themselves to their first situation, is equal to the force impressed; because it produces an equal effect; therefore, in this sort of bodies, there is a power of action twice as great as in the former non-elastic bodies, for these bodies not only strike each other by impulse, but likewise by repulse, they always repelling each other after the stroke. But we have shewn that the force with which non-elastic bodies strike each other is as $V \pm V$; therefore the re-action of elastic bodies is the same; that is, the velocity with which elastic bodies recede from each other after the stroke, is equal to the velocity with which they approached each other before the stroke. Whence if x and y be the velocities of two bodies A and B, tending the same way, after the stroke, since $V-V = y-x$, we have

$$x + V - V = y; \text{ whence the motion of A}$$

after the stroke will be Qx , and that of

B will be $Qx + QV - QV$; and the sum

of these motions will be equal to the sum

of the motions before the stroke, *viz.*

$$Qx + Qx + QV - QV = QV + QV.$$

Whence, by reducing the equation, it

$$\text{will be } Qx + Qx = QV - QV + 2QV;$$

$$\text{and } x = \frac{QV - QV + 2QV}{Q+Q} = \text{the velo-}$$

city of the body A.

Again, the velocity of B is $x + V$

$$- V = \frac{QV - QV + 2QV}{Q+Q} + V - V =$$

$$\frac{2QV - QV + QV}{Q+Q}. \text{ Here we suppose}$$

the bodies tend the same way before the

stroke; and it is evident from the equa-

tion above, that so long as $QV + 2QV$ is

greater than QV , the velocity (x) of A

after the stroke will be affirmative, or the

body A will move the same way after

the stroke as before; but when QV is

greater than $QV + 2QV$, the velocity

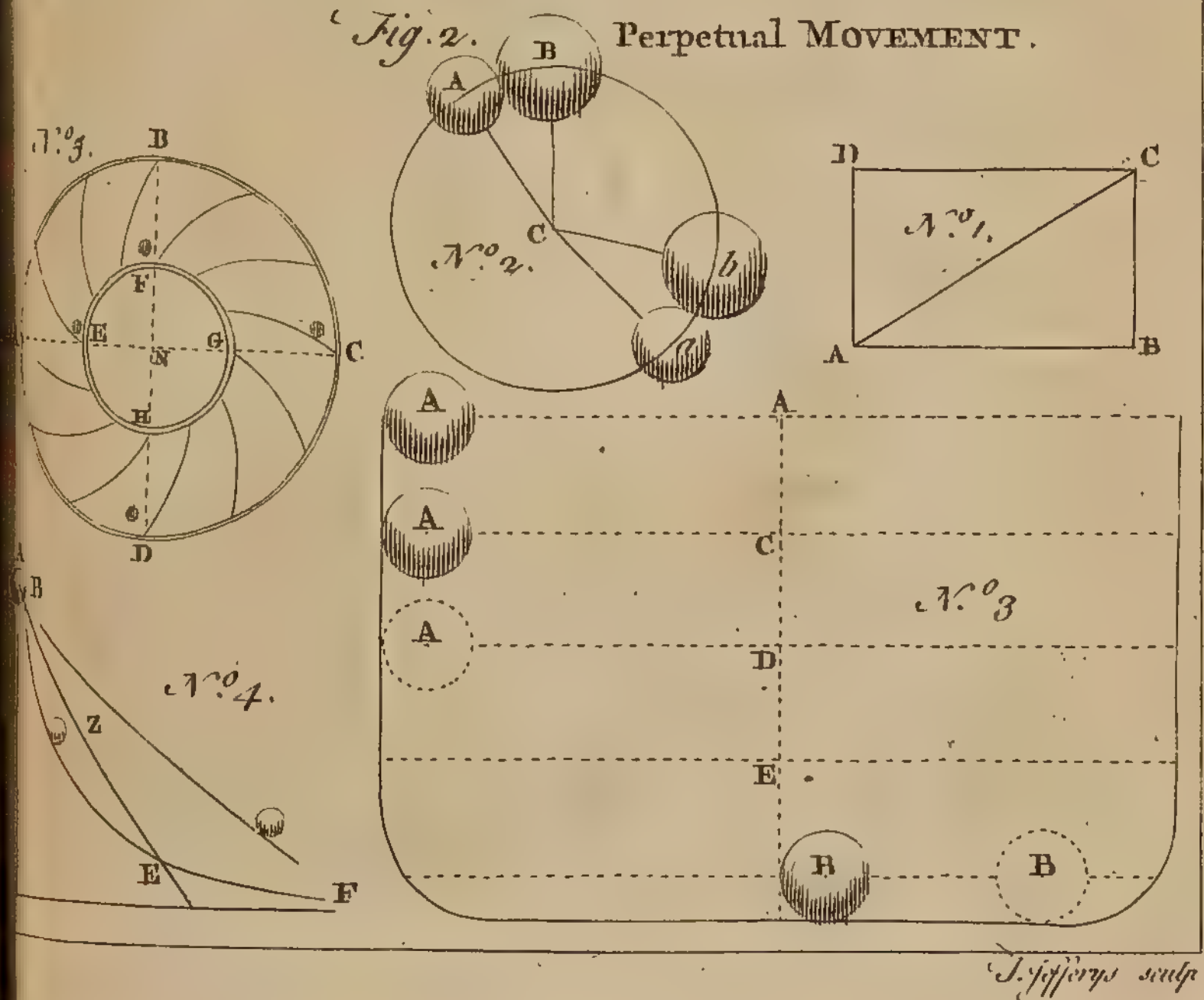
(x) will be negative, or the body A will

be reflected back.

Fig. 1. MOTION.



Fig. 2. Perpetual MOVEMENT.



If the body B be at rest, then $V = 0$;
and $x = \frac{QV - 2QV}{Q + 2}$, which shews the

body A will go forwards or backwards,
as QV is greater or lesser than $2QV$, or
A greater or lesser than B.

If $Q = 3$, $2 = 2$, $V = 10$, (*ibid.* n° 5.)
and $V = 0$; then after the stroke the ve-

locity of A will be $x = \frac{QV - 2QV}{Q + 2} = \frac{30 - 20}{5}$

$= \frac{10}{5} = 2$, and the velocity of B will be

$y = \frac{2QV}{Q + 2} = \frac{60}{5} = 12$. If the bodies are

both in motion, and $V = 5$, the rest is the

same as before; then $\frac{QV - 2QV + 2QV}{Q + 2}$

$= 6 =$ velocity of A (*ibid.* n° 6.) after

the stroke, and $\frac{2QV - QV + 2QV}{Q + 2} = 11$

$=$ velocity of B after the stroke.

If the bodies A and B move towards
contrary parts, or meet each other, then
will the relative velocity, to which the
force of the stroke is proportional, be
 $V + V$; and so the velocities of A and B
after the stroke will be x and $x + V + V$;
and so the motion of A will be Qx and
 $2x + 2V + 2V$; the sum of these mo-
tions is $Qx + 2x + 2V + 2V = QV$
 $- 2V =$ the motion towards the same
part before the stroke. Whence we have

$x = \frac{QV - 2V - 2QV}{Q + 2}$, and therefore
the velocity of B will be $\frac{QV - 2V - 2QV}{Q + 2}$

$+ V + V = \frac{2QV + QV - 2V}{Q + 2}$.

If $QV + 2QV$ be greater than QV , the
motion of the body A will be backwards;
otherwise it will go on forwards as be-
fore.

If $Q = 3$, $2 = 2$, $V = 10$, and $V = 5$;
then will the velocity of A (*ibid.* n° 7.)

be $\frac{QV - 2V - 2QV}{Q + 2} = \frac{-10}{5} = -2$, and

so the body A will go back with two de-
grees of velocity. The velocity of B,

after the stroke, will be $\frac{2QV + QV - 2V}{Q + 2}$

$= 13$.

If the bodies are equal, that is, if $Q = 2$,

(*ibid.* n° 8.) then $x = \frac{-2QV}{2Q} = -V$;

which shews, that when equal bodies
meet each other, they are reflected back
with interchanged velocities; for in that

case also the velocity of B becomes $\frac{2QV}{2Q} = V$.

If the bodies are equal, and one of them
at rest, as B (*ibid.* n° 9.) then since
 $Q = 2$, and $V = 0$, we have the velocity
of A after the stroke $x = 0$; or the body
A will abide at rest, and the velocity of
B will be $= V$, the velocity of A before
the impulse, as appears by the example in
the figure referred to.

If several bodies B, C, D, E, F, (*ibid.*
n° 10.) are contiguous in a right line,
and another equal body A strike B with
any given velocity, it shall lose all its
motion, or be quiescent after the stroke;
the body B which receives it will com-
municate it to C, and C to D, and D to
E, and E to F; and because action and
reaction between the bodies B, C, D, E,
are equal, as they were quiescent before,
they must continue so; but the body F,
having no other body to re-act upon it,
has nothing to obstruct its motion; it
will therefore move on with the same ve-
locity which A had at first, because it
has all the motion of A, and the same
quantity of matter by hypothesis.

Let there be three bodies A, B, C, (*ibid.*
n° 11.) and let A strike B at rest; the
velocity generated in B by the stroke will

be $y = \frac{2QV}{Q + 2}$, and so the momentum
of B will be $\frac{2QVQ}{Q + 2} = 2y$. With

this momentum B will strike C at rest
and contiguous to it; the velocity gene-

rated in C will be $\frac{2Qy}{2 + C}$; and its mo-

mentum will be $\frac{2QyC}{2 + C} = \frac{2QC}{2 + C} \times \frac{2QV}{Q + 2}$

$= \frac{4QVQC}{QQ + QC + 2^2 + 2C}$

If now we suppose B a variable quan-
tity, while A and C remain the same,
we shall find what proportion it must
have to each of them, in order that the
momentum of C may be a maximum, or
the greatest possible, by putting the
fluxion thereof equal to nothing; that is,

$\frac{4Q^2C^2VQ - 4QCQ^2Q}{(QC + QQ + 2C + 2^2)^2} = 0$; whence

we get $QC - 2Q = 0$, and so $QC = 2Q$;
consequently $Q : 2 :: 2 : C$, or $A : B ::$
 $B : C$; that is, the body B is a geome-
trical mean between A and C. Hence
if there be any number (n) of bodies in
a geometrical ratio (r) to each other,
and the first be A; the second will be

rA ,

MCTTO,

MOTTO, in armoury, a short sentence or phrase carried in a scroll, generally under, but sometimes over the arms; sometimes alluding to the bearing, sometimes to the name of the bearer, and sometimes containing whatever pleases the fancy of the deviser. The motto, or word, says Guillim, is an ornament annexed to coat-armour; being the invention or conceit of the bearer succinctly and significantly expressed, usually in three or four words, which are commonly set in some scroll or compartment, placed at the foot of the escutcheon. Our ancestors made choice of such mottos as expressed their predominant passions, as of piety, love, war, &c. or some extraordinary adventure that had befallen them: most of which have become hereditary in several families. The motto of the royal family of England is *DIEU ET MON DROIT*, *God and my right*: of the present king of France, *ESPERANCE*, *hope*: of the most noble order of the garter, *HONI SOIT QUI MAL Y PENSE*, *evil be to him that evil thinks*: of the dukes of Norfolk, *SOLA VIRTUS INVICTA*, *only virtue is invincible*; of the duke of Beaufort, *MUTARE VEL TIMERE SPERNO*, *I scorn to change or fear*: of the duke of Kingston, *PIE REPONE TE*, *rest in piety*, in allusion to his name of Pierpoint.

MOTU. See *EX MERO MOTU*.

MOVEABLE, in general, denotes any thing capable of being moved.

The moveable feasts are such as are not regularly held on the same day of the year or month, though they are always on the same day of the week. Thus Easter, which is that moveable feast on which all the rest depend, is held on the Sunday which falls upon, or next after, the first full moon following the 21st of March; and all the other feasts keep a regular and certain distance from it: such as Septuagesima, Sexagesima, Ash-wednesday, Ascension-day, &c. which see under their proper articles.

The moveable terms are Easter term, and Trinity term. See *TERMS*.

MOVEABLE GOODS, in law, such chattels as are capable of being removed from one place to another, as cattle, merchandize, &c. See the article *CHATTELS*.

MOVEMENT, in mechanics, a machine that is moved by clock-work; for the theory of which, see the articles *CLOCK*, *WATCH*, &c.

To make a regular movement, that may serve to measure time as exactly as pos-

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sible, is one of the most valuable problems in mechanics, which has been most successfully effected, hitherto, by adapting pendulums to clocks: though it must be owned, says Mr. Maclaurin, that many ingenious contrivances have been invented to correct the irregularities of those movements that go by springs.

Perpetual MOVEMENT. Some have attempted to find a perpetual movement, but without success; and there is reason to think, from the principles of mechanics, that such a movement is impossible: for though in many cases of bodies acting upon one another, there is a gain of absolute motion; yet the gain is always equal in opposite directions, so that the quantity of direct motion is never increased.

To make a perpetual movement it appears necessary, that a certain system of bodies, of a determined number and quantity, should move in a certain space for ever, and in a certain way and manner: and for this there must be a series of actions returning in a circle, otherwise the movement will not be perpetual; so that any action by which the absolute quantity of force is increased, of which there are several sorts, must have its corresponding counter-action, by which the gain of force is destroyed, and the quantity of force restored to its first state. See the article *FORCE*.

Thus, by these actions, there will never be any gain of direct force, to overcome the friction and the resistance of the medium; so that every motion being diminished by these resistances, they must at length languish and cease.

To illustrate this, it is allowed, that, by the resolution of force, there is a gain or increase of the absolute quantity of force: thus, the two forces $A B + B C$ (plate CLXXXIII. fig. 2. n° 1.) exceed the force $A C$, which is resolved into them. But you cannot proceed resolving motion in infinitum, by any machine whatsoever; but those you have resolved must be again compounded, in order to make a continual movement; and the gain, obtained by the resolution, will be lost again by the composition.

In like manner, if you suppose A and B (*ibid.* n° 2.) to be perfectly elastic bodies, and that the lesser body A strikes the greater one B quiescent, there will be an increase of the absolute quantity of force, because A will be reflected; but if you suppose them both to turn round any center C , after the stroke, so as to meet

again in *a* and *b*, this increase of force will be lost, and their motion reduced to its first quantity. Such a gain therefore of force, as must be afterwards lost in the actions of bodies, can never produce a perpetual movement.

There are various ways besides these, by which absolute force may be gained; but since there is always an equal gain in opposite directions, and no increase obtained in the same direction, this gain must be presently lost in the circle of actions necessary to make a perpetual movement.

Some authors propose to make a perpetual movement upon these principles: let the height *AB* (*ibid.* n° 3.) be divided into four equal parts *AC*, *CD*, *DE*, *EB*: then suppose the body *A* to acquire, by the descent *AB*, a velocity as 1, and this motion by any contrivance to be transmitted to an equal body *B*; then let the body *A*, by an equal descent *CD*, acquire another motion as 1, to be transmitted likewise to the same body *B*, which in this manner is supposed to acquire a motion as 2, that is sufficient to carry it upwards from *B* to *A*; and because there yet remains the motion which *A* acquires by the descents *DE* and *EB*, that may be sufficient to keep an engine in motion, while *B* and *A* ascend and descend by turns. Thus, they rashly conclude, that a sufficient gain of force may be obtained in this manner, to produce a perpetual movement; for it is demonstrable from the principles of motion, that a motion as 2 cannot be produced in *B* by the two successive impulses transmitted from *A*, each of which is as 1.

Others have proposed projects for producing a perpetual movement, with a design to refute them; but by mistaking the proper answer, have rather confirmed the unskilful in their groundless expectations. An instance of this we have in Dr. Wilkin's mathematical magic, B. II. c. 13. where a loadstone at *A* (*ibid.* n° 4.) is supposed to have a sufficient force to bring up a heavy body along the plane *FA*, from *F* to *B*; whence the body is supposed to descend by its gravity, along the curve *BEF* till it return to its first place *F*; and then to rise again along the plane *FA*, and descend along the curve *BEF*, continually. But supposing *BZE* to be the surface upon which if a body was placed, the attraction of the loadstone and the gravity of the body

would balance each other; this surface must meet *BEF* at some point *E*, between *A* and *F*; so that when it comes to the point *E*, it must of course be stopped, and an end put to the motion.

What seems to promise the possibility of such a movement, is this, *viz.* that the momenta of equal bodies are as their distances from the center of motion. Hence, say the perpetual motion men, if a wheel were constructed of the form of that in the figure *ABCD* (*ibid.* n° 5.) with circular cells going from the inner part *EFGH* to the outer, containing equal balls, *C*, *D*, *E*, *F*; then upon turning the wheel they must move towards the center *N* on one part, as the ball *E*; and from it on the opposite part, as the ball *C*; and by this means the ball *C* will have a greater momentum than the ball *F*, and so will determine the wheel to move round; and since this must be the case of all the balls *E* and *C* that come into the situation *EC*, the wheel must necessarily move continually, because it will bring two balls into that situation. It is true, were there but two balls *E* and *C*, the ball *C* would by this contrivance move the wheel $\frac{1}{4}$ round, *viz.* while it descended from *C* to *D*; and by this means would raise the ball *E* to *F*, and there they will abide in the situation *DF*; but, say the men of this persuasion, two other balls, succeeded to the places *E* and *C*, will still keep the wheel moving. Yes, so they would, if the balls at *D* and *E* could be taken away the moment they come into that position; not else, for the balls *C* and *E*, in order to move the wheel, must move the balls *D* and *F*, which have equal momenta (as being at the same distance each from the center, as are the other two respectively) which is absurd by the general proposition.

The absurdity of a perpetual motion will still farther appear, if we consider that the momenta of bodies are always proportioned to the perpendicular descent or ascent to or from the center of the earth. Since, therefore, in the wheel the bodies are all equal by supposition, and the perpendicular spaces through which they descend and ascend, above and below the horizontal line or diameter *AC*, are equal; it follows, that an equilibrium must necessarily ensue. Thus, so far is this wheel from producing a perpetual motion, that it admits of none at all.

MOULD, or MOLD, in the mechanic arts,

&c. a cavity cut with a design to give its form or impression to some softer matter applied therein, of great use in sculpture, foundery, &c.

The workmen employed in melting the mineral or metallic glebe dug out of mines, have each their several moulds to receive the melted metal as it comes out of the furnace; but these are different according to the diversity of metals and works. In gold-mines they have moulds for ingots; in silver-mines, for bars; in copper and lead mines, for pigs or salmons; in tin-mines, for pigs and ingots; and in iron-mines, for saws, chimney-backs, anvils, caldrons, pots, and other large utensils and merchandizes of iron, which are here cast as it were at first hand.

The Moulds of founders, for large works, as statues, bells, guns, as also those for small works, may be seen under the article **FOUNDERY**.

The Moulds of moneyers, are frames full of sand wherein the plates of metal are cast that are to serve for the striking of species of gold and silver. See the article **COINING**.

MOULDS, in the manufacture of paper, are little frames composed of several brass or iron-wires, fastened together by another wire still finer. Each mould is of the bigness of the sheet of paper to be made, and has a rim or ledge of wood to which the wires are fastened; these moulds are more usually called frames, or forms.

Furnace and crucible-makers Moulds, are made of wood, of the same form with the crucibles; that is, in form of a truncated cone: they have handles of wood to hold and turn them with, when, being covered with the earth, the workman has a mind to round or flatten his vessel.

Moulds for leaden bullets, are little iron-pincers, each of whose branches terminates in an hemispherical concavity, which when shut, form an intire sphere: in the lips or sides where the branches meet, is a little jet or hole through which the melted lead is conveyed.

Glaziers-Moulds. The glaziers have two kinds of moulds, both serving to cast their lead. In the one they cast the lead into long rods or canes fit to be drawn through the vice, and the grooves formed therein: this they sometimes call ingot-mould. In the other they mould those little pieces of lead a line thick, and two lines broad, fastened to the

iron-bars: these may be also cast in the vice.

Goldsmiths-Moulds. The goldsmiths use the bones of the cuttle-fish to make moulds for their small works, which they do by pressing the pattern between two bones, and leaving a jet or hole to convey the silver through, after the pattern has been taken out.

MOULD, among masons, a piece of hard wood or iron hollowed withinside, answerable to the contours of the mouldings or corniches, &c. to be framed: this is otherwise called caliber.

MOULDS, among plumbers, are the tables whereon they cast the sheets of lead. These they sometimes call simple tables: besides which they have other real moulds wherewith they cast pipes without soldering. See the article **PLUMBERY**.

MOULDS, among grinders of optic-glasses. See the article **GRINDING**.

MOULDS, used in basket-making are very simple, consisting ordinarily of a willow, or osier, turned or bent into an oval, circle, square, or other figure, according to the baskets, panniers, hampers, hats, and other utensils intended. On these moulds they make or more properly measure all their work, and accordingly they have them of all sizes, shapes, &c.

MOULDS, among tallow-chandlers, are of two kinds: the first for the common dipped candles, being the vessel wherein the melted tallow is disposed, and the wick dipped: this is of wood, of a triangular form, and supported on one of its angles, so that it has an opening of near a foot at top: the other, used in the fabric of mould candles, is of brass, pewter, or tin; here each candle has its several moulds. See the article **CANDLE**.

MOULD, among gold-beaters, a certain number of leaves of velom, or pieces of guts, cut square, of a certain size, and laid over one another, between which they put the leaves of gold and silver, which they beat on the marble with the hammer. They have four kinds of moulds, two whereof are of velom, and two of gut; the smallest of those of velom consists of forty or fifty leaves, the largest contains an hundred: for the others, each contains five hundred leaves. The moulds have all their several cases, consisting of two pieces of parchment, serving to keep the leaves of the mould in their place, and prevent their being disordered in beating.

MOULD, in agriculture, a loose kind of earth, every where obvious on the surface

face of the ground, called also natural or mother-earth; by some also loam. See the article EARTH.

The goodness of a mould for the purposes of gardening, &c. may be known, according to Miller, by the sight, smell, and touch. 1. Those moulds that are of a bright chesnut or hazelly colour, are counted the best: of this colour are the best loams, and also the best natural earth; and this will be the better yet, if it cut like butter, and does not stick obstinately, but is short, tolerably light, breaking into small clods, is sweet, will be tempered without crusting or chopping in dry weather, or turning to mortar in wet. Next to that the dark grey and russet moulds are accounted the best: but the light and dark ash-coloured the worst, such as is usually found on common heathy ground: the clear tawney is by no means to be approved; but that of a yellowish red colour is the worst of all: this is commonly found in wild and waste parts of the country, and for the most part produces nothing but goss, furze, and fern, according as their bottoms are more or less of a light and sandy, or of a spewey, gravel, or clayey nature. 2. All lands that are good and wholesome, will, after rain, or breaking up by the spade, emit a good smell. 3. By the touch we may discover whether it consists of substances entirely arenaceous, or clammy; or, as it is expressed by Mr. Evelyn, whether it be tender, fatty, deterfive, or slippery; or more harsh, gritty, porous, or friable.

MOULDINESS, a term applied to bodies which corrupt in the air, from some hidden principle of humidity therein; and whose corruption shews itself by a certain white down, or lanugo, on their surface, which, viewed through a microscope, appears like a kind of meadow, out of which arise herbs and flowers, some only in the bud, others full blown, and others decayed, each having its root, stalk, and other parts. See the articles CORRUPTION and VEGETATION.

MOULDING, any thing cast in a mould, or that seems to have been so, though in reality it were cut with a chissel, or the ax. Moulding of figures in paste is done as follows: take the crumb of a new drawn white loaf, beat it, and roll it with a rolling-pin as fine and as far as it will go; then print it on the moulds: and when it has taken the suitable figure you desire, dry it in a stove, and it will be very hard: and to preserve it from vermin, you

may mix a little powder of aloes with it. To mould small figures of jasper-colour: oil your moulds with a fine pencil, and diversify them with such colours as you please, with gum-tragacanth; if they spread or run, put a little of the gall of an ox, for the thicker it is, the harder it will be: then mould your paste of the colour of jasper, or the like; put it in to fill the mould; tie it with a wire, and take it out; repair and varnish it, and set it to harden.

MOULDINGS, in architecture, projectures beyond the naked wall, column, wainscot, &c. the assemblage of which forms corniches, door-cases, and other decorations of architecture. See pl. CLXXXI. fig. 4.

Some mouldings are square, others round, some are straight, others curved, &c. and some are plain, others carved, or adorned with sculpture, either hollowed or in relievo: some again are crowned with a fillet, others are without, as the doucine, talon, ovolo, torus, scotia, astragal, gula, corona, &c. See the articles DOUCINE, &c.

Mouldings are in architecture, what letters are in writing; by the various dispositions and combinations of mouldings may be made an infinite number of different profiles, for all sorts of orders and compositions, regular or irregular; and yet all the kinds of mouldings may be reduced to three, viz. square, round, and mixed, i. e. composed of the other two. For this reason, those who invented the gothic architecture, resolving to recede from those perfect figures, and affecting to use others less perfect, to distinguish their architecture from the antique, introduced a new set of whimsical mouldings and ornaments. Regular mouldings are either large, as doucines, ovolos, gulas, talons, scotias, &c. or small, as fillets, astragals, conges, &c.

MOULIN, or *Fer de MOULIN*. See the article FER.

MOULINS, a city of France, in the province of Lioinois, and duchy of Bourbon, situated forty-seven miles south-east of Bourges.

MOULINET, is used, in mechanics, to signify a roller, which being crossed with two levers, is usually applied to cranes, capstans, and other sorts of engines of the like nature, to draw ropes, and heave up stones, &c.

MOULINET is also a kind of turnstile, or wooden cross, which turns horizontally upon

upon a stake fixed in the ground; usually placed in passages to keep out horses, and to oblige passengers to go and come one by one. These moultnets are often set near the outworks of fortified places at the sides of the barriers, through which people pass on foot.

MOULTING, or MEWING. See the article **MEWING**.

MOUND, a term used for a bank or rampart, or other fence, particularly that of earth.

MOUND, in heraldry, a ball or globe with a cross upon it, such as our kings are usually drawn with, holding it in their left hands, as they do the sceptre in the right.

MOUNT, an elevation of earth, called also mountain. See **MOUNTAIN**.

Saint Catharine of MOUNT Sinai. See the article **CATHARINE**.

Knights of MOUNT Carmel. See the article **CARMELITES**.

MOUNT-CASSEL, a town of the french Netherlands, in the province of Flanders, situated fifteen miles south-west of Ypres.

MOUNT ST. MICHAEL, a borough-town of Cornwall, situated on a bay of the English channel, called Mountsbay, eighteen miles west of Falmouth.

It sends two members to parliament.

MOUNT ST. MICHAEL is also a fortress of France, in the province of Normandy, situated on a rock in the English channel, twenty miles east of St. Malo.

MOUNT-SORREL, a market-town of Leicestershire, seven miles north of Leicester.

MOUNT-EGG. In the tin-works, after the tin from the burnt ore is melted down and remelted, there will sometimes remain a different slug in the bottom of the float; this they call mount-egg: and though of a tin-colour, yet is of an iron-nature, as has been found by applying a magnet to it.

MOUNT of Piety, certain funds or establishments in Italy, where money is lent out, on some small security. We had also mounts of piety in England, raised by contribution, for the benefit of people ruined by the extortions of the Jews.

MOUNTAIN, *mons*, a part of the earth, rising to a considerable height above the level of the surface thereof.

The origin of mountains is variously assigned by philosophers: some will have them coeval with the world, and created along with it; others, among whom is Dr. Burnet, will have them to take their

rise from the deluge, urging that the extreme irregularity and disorder visible in them, plainly shews they do not come immediately out of the hand of God, but are the wrecks of the old world, broken into the abyss. See **DELUGE**.

Others, again, alledge from history, that the roots of many hills being eaten away, the hills themselves have subsided and sunk into plains; whence they conclude, that where the corruption is natural, the generation is so too. It appears certain to many, that some mountains must have been generated gradually, and have grown up in process of time, from the sea-shells, &c. found in them, which they suppose may be accounted for, from a violent wind blowing the sand, &c. into huge heaps, which were made into a mass by the rain, &c. The origin of mountains in the opinion of Mr. Ray, seems to have been from explosions, by means of subterraneous fires; and he thinks it very probable, that they all have vast hollows beneath them; and that this might have been the means used at the creation, to make the dry land appear, he thinks no way dissonant to reason, since history proves that fires have raged in subterraneous caverns under the seas; and there is no natural impossibility in fire's subsisting in such caverns, even when the earth was all over covered with water, as at the first creation.

Mountains appear to many, defects and blemishes in the earth; but they are truly of the utmost use and necessity to the well-being both of man and other animals. They serve as screens to keep off the cold and nipping blasts of the northern and eastern winds; they serve for the production of a great number of vegetables and minerals, which are not found in any other soil; the long ridges and chains of lofty and topping mountains being generally found to run from east to west, serve to stop the evagation of the vapours towards the poles, without which they would all run from the hot countries, and leave them destitute of rain. Mr. Ray adds, that they condense these vapours, like alembic heads, into clouds, and so, by a kind of external distillation, give origin to springs and rivers; and, by amassing, cooling, and constipating them, turn them into rain, and by that means render the fervid region of the torrid zone habitable. He farther adds, that many creatures cannot live but in particular situations, and even the tops of the highest
and

and the coldest mountains are the only places where some creatures, as well birds as quadrupeds, will live; of this kind are the ibex and chamois among beasts, and the lagopus among birds. See the articles IBEX, &c.

To measure the height of a mountain, the same method must be used as is done in measuring any other inaccessible height. See the article HEIGHT.

There is another method proposed for taking the height of a mountain, by means of the barometer: thus, it is to be observed, how many inches or parts of inches, the quicksilver is depressed, at the top of the mountain we have a mind to measure, below the altitude it hath acquired, at the same time, at the bottom or superficies of the sea; for hence the true height of the mountain may be found, from an established proportion. In order to discover the height of a mountain, or that of any other thing, Dr. Halley, from barometrical observations, on Snowden-hill, concludes that the quicksilver descends a tenth of an inch every thirty yards of ascent: and Dr. Derham, by good observations on the Monument of London, reckons eighty two feet for every tenth of an inch; but, by very nice observations which he afterwards made with excellent instruments, at divers altitudes, in St. Paul's dome, and when the barometer was at a different height, he found, at near ninety feet, the quicksilver sunk one tenth, and at somewhat less than double and treble that height, two tenths, and three tenths, &c. according to Dr. Halley's and Mr. Cassini's tables. See the article BAROMETER.

To measure the height of a lunar mountain is a curious problem, and, at the same time, very easy to effect in the following manner. Let C (plate CLXXXII. fig. 8.) be the moon's center, E D B a ray of the sun touching the moon's surface in D, and the top of a mountain in B. Draw C B and C D; the height of the mountain A B is to be found. With a micrometer in a telescope, find what proportion the distance of the top of the mountain B, from the circle of illumination at D, bears to the diameter of the moon, that is, the proportion of the line D B to D F; and because D F is known in miles, D B will be also known in that measure.

Now admit that $DB : DC :: 1 : 8$, as in one of the hills it will be; then DC^2

$+ DB^2 = 64 + 1 = 65 = CB^2$; whence $\sqrt{65} = 8.062 = BC$; wherefore $BC - AC = 8.062 - 8 = 0.062 = AB$, the height of the mountain required. Wherefore, $AC : AB :: 8 : 0.062 :: 8000 : 62$. And, since the moon's semidiameter $AC = 1096$ miles, therefore $8000 : 62 :: 1096 : 8.5$ nearly. This mountain then, being $8\frac{1}{2}$ miles high, is near three times higher than the highest mountain on the earth.

Burning MOUNTAIN. See VULCANO.

Cat of the MOUNTAIN, in zoology. See the article CAT.

Cock of the MOUNTAIN, in zoology. See the article UROGALLUS.

MOUNTING, in the mechanic arts, something that serves to raise or set off a work: thus, the frame and its dependences make the mounting of a looking-glass; the hilt, the mounting of a sword; the fust, or but, the mounting of a carbine, musquet, &c. and the mounting of a fan, is the sticks which serve to open and shut it.

MOUNTING, in military affairs, signifies going upon duty: thus, mounting a breach, is running up to it; mounting the guard, is going upon guard; and mounting the trenches, is going upon duty in the trenches; but mounting a cannon, mortar, &c. is the setting it on its carriage, or the raising its mouth.

MOUREMANSKOY, the north-west part of russian Lapland, in Europe.

MOURNERS, an order of penitents in the antient christian church, who lay prostrate in the porches of churches, begging the prayers of the faithful, as they went in, and desiring to do public penance in the church. See the article PENITENTS.

MOURNING, among the antients, was expressed by very different signs, as by tearing their cloaths, wearing sackcloth, laying aside crowns and the other ensigns of honour: thus Plutarch, in his Life of Cato, relates, that from the time of his leaving the city with Pompey, he neither shaved his head, nor, as usual, wore the crown, or garland. A public grief was sometimes testified by a general fast. Among the Romans, a year of mourning was ordained, by law, for women who had lost their husbands. In public mournings, the shops of Rome were shut up; the senators laid aside their laticlavian robes; the consuls sat in a lower seat than usual; and the women laid aside all their ornaments. The antients had a remarkable way of mourning

ing for soldiers slain in battle; the whole army attended the funeral solemnities, with their arms and shields turned upside down. See the article FUNERAL.

The mournings of the eastern nations of Indians are much more closely followed, though of much shorter duration than ours. After the death of a near relation, they mourn fifteen days, during which time they eat nothing but rice and water: they are not to chew betle, or to use the common washings; but are to perform acts of charity, such as distributing food to the poor; and prayers are said, intreating the almighty to forgive the sins of the deceased, and to assign him a good place in the other world. On the sixteenth day, when the mourning is ended, they make a solemn feast, according to their abilities, and invite to it all their friends and neighbours. After this they annually, on the same day, give food to the poor, and renew their prayers for the happiness of the dead person.

The colours of the dress or habit worn to signify grief, are different in different countries. In Europe, the ordinary colour for mourning is black; in China, it is white, a colour that was the mourning of the antient spartan and roman ladies; in Turkey, it is blue, or violet; in Egypt, yellow; in Ethiopia, brown; and kings and cardinals mourn in purple. Every nation and country give a reason for their wearing the particular colour of their mourning: black, which is the privation of light, is supposed to denote the privation of life; white is an emblem of purity; yellow is to represent, that death is the end of all human hopes, because this is the colour of leaves when they fall, and flowers when they fade; brown denotes the earth, to which the dead return; blue is an emblem of the happiness which it is hoped the deceased enjoys; and purple, or violet, is supposed to express a mixture of sorrow and hope.

MOUSE, in zoology, a species of mus, with a long and almost naked tail, and a white belly. See the article MUS.

It is common every where in houses and fields.

MOUSE-EAR, *myosotis*, in botany. See the article MYOSOTIS.

MOUSE-TAIL, *myosurus*. See the article MYOSURUS.

Dor-MOUSE, *forex*. See SOREX.

Sea MOUSE, *aphrodita*. See the article APHRODITA.

MOUSEL, or MOSUL, a city of asiatic

Turky, in the province of Diarbec, or Mesopotamia, situated on the river Tigris, opposite the place where Nineveh stood: east long. 43° , and north lat. 36° .

MOUTH, in anatomy, a part of the face, consisting of the lips, the gums, the insides of the cheeks, the palate, the salival glands, the os hyoides, the uvula, and the tonsils, which see under their proper articles.

Mr. Derham observes, that the mouth in the several species of animals, is nicely adapted to the uses of such a part, and well sized and shaped for the formation of speech, the gathering and receiving of food, the catching of prey, &c. In some creatures it is wide and large, in others little and narrow; in some it is formed with a deep incisure into the head, for the better catching and holding of prey, and more easy comminution of hard, large, and troublesome food; and in others with a shorter incisure, for the gathering and holding of herbaceous food. In birds, it is neatly shaped for piercing the air; hard and horny, to supply the want of teeth; hooked, in the rapacious kind, to catch and hold their prey; long and slender in those that have their food to grope for in moorish places; and broad and long, in those that search for it in the mud. Nor is the mouth less remarkable in insects: in some it is forcipated, to catch, hold, and tear the prey; in others aculeated, to pierce and wound animals and suck their blood; in others, strongly rigid, with jaws and teeth, to gnaw and scrape out their food, carry burdens, perforate the earth, nay the hardest wood, and even stones themselves, for houses and nests for their young.

MOUTH of a horse, in the manege, should be moderately well cloven; for when it is too large, it is difficult to bit a horse, so as that he may not swallow it, as the horsemen term it; and if he has a small mouth, it will be difficult to get the bit rightly lodged in it.

A horse is said to have a fine, sensible, tender, light, or loyal mouth, when he is so sensible in that part where the bit is placed, as to obey the least motion of the bridle; so a false mouth is a mouth that is not at all sensible, though the parts look well, and are well formed; and a mouth is said to be fixed and certain, when a horse does not check or beat upon the hand. See the article HAND.

MOUTH is used in the courts of princes, for what relates to their eating and drink-

ing: hence officers of the mouth, yeomen of the mouth.

Opening and shutting the MOUTH of a cardinal. See the article **CARDINAL**.

MOUTON D'ORE, an antient french gold-coin, worth about twelve sols six deniers: it was first struck in the reign of St. Louis, and probably took its name from the figure of a lamb represented on one of its sides.

MOXA, a sort of cotton or downy substance separated from the leaves of a sort of indian mug-wort; used by the eastern nations for cauterizing in certain parts of the body. See the articles **CAUSTICS**, **CAUTERIZATION**, and **CAUTERY**.

The first caustic of this kind we find used, was by Hippocrates and the other antient physicians, to cauterize parts in pain. Some of the moderns wonderfully extol cauterization with moxa, as the most effectual means to cure, and wholly extirpate the gout: but for the art of cauterizing with it, Heister thinks it necessary to observe the following particulars, *viz.* in the first place, to make a small cone of the moxa, about a thumb's breadth long, made after the same manner as those commonly used for a suffitus; the basis of this cone is to be stuck upon the part with gum arabic, or gum tragacanth, and its point is then to be fired by a candle, or burning coal; by which means not only the cone will be gradually consumed, but the painful part will be at last cauterized, and thence the pain of the gout will frequently have some remission; but if the pains do not entirely vanish at the first, a new cone is to be applied again to the part, and the cauterization thus continued till the pain ceases; but however this process may have been cried up by many of the Europeans, it is at present quite in disuse, on account, that besides the acute pain it causes, it is frequently found to have little or no effect.

MOYNEAU, or **MOINEAU**, in fortification. See the article **MOINEAU**.

MSCYSLAW, the capital of the palatinate of Mscyslaw, in Poland, situated on the frontiers of Muscovy: east long. 31° 30', and north lat. 54° 34'.

MUCILAGE, in pharmacy, is in general any viscid and glutinous liquor.

For the preparation of the mucilage of tragacanth, we must have four vessels, either of delf-ware, or common earth, varnished. Into one of these put a dram and a half of white gum tragacanth,

bruised; into another put half an ounce of the seeds of psyllium; into another, three drams of quince-seeds; and in the fourth six drams of the root of marshmallows, well cleansed, cut into small portions and bruised: upon the gum tragacanth pour two ounces and a half of strawberry-water, and as much of betony-water; then cover the vessel, and place it over hot ashes, for three or four hours, or till the gum is entirely melted and incorporated with the water; then the matter is to be passed through a proper searce.

In preparing the mucilage of flea-wort, or psyllium, pour three ounces of strawberry-water, and as much of betony-water, on the seeds of psyllium; then cover the vessel, and let the matter stand in infusion over warm ashes, for eight or ten hours: after which, boil the infusion gently, and strain it by expression.

In making a mucilage of quinces, on the quince-seeds pour two ounces and a half of betony-water, and as much of the water of strawberries: cover the vessels, and leave the matter in fusion, for eight or ten hours; after which heat the infusion till it is almost ready to boil; then it is to be strained by expression.

MUCILAGE also denotes a thick pituitous matter, evacuated with the urine, in the gravel and dysuria. See the articles **STONE** and **DYSURY**.

MUCILAGE also imports the liquor which principally serves to moisten the ligaments and cartilages of the articulations; and is supplied by the mucilaginous glands. See the next article.

MUCILAGINOUS GLANDS, in anatomy, a very numerous set of glands, serving to secrete the mucilage of the joints. See **GLAND**, and the preceding article.

These glands are commonly situated in the joint after such a manner as to be gently pressed, but not destroyed by its motion; by which means, when there is the greatest necessity for the mucilage, that is, when the most frequent motions are performed, the greatest quantity of it must be secreted. These glands are soft and pappy, but not friable; they are mostly of the conglomerate kind: their excretory ducts are long, and hang loose like so many fringes, within the articulation, which, by its motion and pressure, will prevent obstructions in the body of the gland itself, or its excretories, and will promote the return of the mucilage, when

When fit to be taken up by the absorbent vessels; and at the same time the pressure on the excretory ducts hinders a superfluous excretion, while the fimbriated disposition of these excretories will not allow any of the secreted liquor to be pushed back again by these canals towards the glands.

MUCOCARNEOUS, a name whereby some authors call a sort of abscesses, which are partly made up of flesh, and partly of a thick mucous matter.

MUCOR, in botany, a genus of mushrooms, being funguses consisting of roundish little bladders, in which are found numerous seeds, affixed to hair-like receptacles, placed all over the inside of the bladders.

MUCOUS GLANDS, in anatomy, three glands, which empty themselves into the urethra; so called by their first discoverer, Mr. Cowper, from the tenacity of the liquor which they separate.

The two first of these are about the bigness of a french-bean, of a depressed oval figure, and a yellowish colour, like the prostates; being on each side the bulb of the cavernous body of the urethra, a little above it. Their excretory ducts spring from the internal surface, next the inner membrane of the urethra; into which they open a little lower, by two distinct orifices, just below its bending under the ossa pubis, in perinæo, where they discharge a transparent visciduous liquor. The third mucous gland is a small, conglobate, yellowish gland like the former, but somewhat less, situated above the angle of the flexure of the urethra, under the ossa pubis, in the perinæum, near the anus. It has two excretory ducts, which enter the urethra obliquely, a quarter of an inch below the two former, and discharges a liquor like them both in colour and consistence.

MUCOUS FEVER, a term used by medical writers, to express those fevers, in which nature is endeavouring to rid herself of an abundance of pituitous, mucous, and serous matter. The catarrhal fevers of all sorts are expressed under this denomination. See **CATARRHAL FEVER**.

MUCRO CORDIS, in anatomy, the lower or pointed end of the heart. See **HEART**.

MUCUS, a mucilaginous liquor separated by the mucous glands, and the nostrils. See the articles **MUCOUS GLANDS**, **NOSTRILS**, and **GLAND**.

The mucus of the urethra is a viscid transparent liquor, serving to line and lubricate the part, that the seed and the

urine may slip more freely, without either adhering to, or lacerating the part. The mucus of the nostrils is a viscid excrementitious humour, separated by its proper glands, placed in the internal membrane of those parts, serving to moisten, lubricate, and defend the olfactory nerves which being extremely soft and naked, would, without such provision, be soon spoiled.

MUER, a town of Germany, in the circle of Austria, and dutchy of Stiria, situated on the river Muér, twenty-five miles north-west of Gratz.

MUER is also a river of Germany; which rises in Bavaria, and running east thro' the dutchy of Stiria, by Muér and Gratz, unites with the river Drave, at Legard, near Kanisha, in Hungary.

MUFFLE, in metallurgy, an arched cover, resisting the strongest fire, and made to be placed over coppels and tests in the operations of assaying, to preserve them from the falling of coals and ashes into them; though, at the same time, of such a form, as is no hindrance to the action of the air and fire on the metal, nor to the inspection of the assayer. The muffles may be made of any form, providing they have these conditions; but those used with coppels are commonly made semi-cylindrical; or when greater vessels are employed, in form of a hollow hemisphere. The muffle must have holes, that the assayer may look in; and the fore part of it must be always quite open, that the air may act better in conjunction with the fire, and be incessantly renewed; the apertures in the muffle serve also for the regimen of the fire, for the cold air rushing into the large opening before, cools the bodies in the vessel; but if some coals are put in it, and its aperture before be then shut, with a door fitted to it, the fire will be increased to the highest degree, much more quickly than it can be by the breathing holes of the furnace. Another use of these apertures is also, that the arsenical vapours of lead and antimony passing through the holes in the back part of the muffle, may not be offensive to the assayer, who stands before it. As to the height, length, and depth of the muffles, these must be proportioned to the size and number of the vessels they are intended to cover; and care must be taken in this, that all the parts of the inner surface of these vessels be in the reach of the assayer's eye. The most frequent size of the muffle is, however, four inches high,

fix or eight long, and four or six inches broad. The segments cut off at the bases, for the lesser holes, must be of such a proportioned height that the least vessels put under, may not be in the way of coals or ashes falling into them. Wooden moulds of a proper shape are most convenient for making these muffles in, and the matter for making them, is the same with that of the german clay-tests; that is, either of a pure native clay, of a condition to bear the fire, which will be known upon the trial; or such clay hardened by a mixture of the powder of stones: and, in order to the forming of these, the mass must be made tolerably soft and pliant, by kneading it on a flat stone; then spread it out evenly into a thin cake, somewhat longer and broader than you intend the muffle to be made; and so thick, that two or more thin plates, of about two lines thick each, may be cut off from it. One of those thin plates being cut off from the cake, is to be rubbed over with oil or fat, and then laid over the mould; then cut out a semicircular piece from the mass, of the same thickness with the former, and lay this on the back plane of the mould, joining the edges of this plate to those of the former, wetting them well with water: another thin plate must be cut off, for the bottom of the muffle. The muffle thus made, let it be wetted, and carefully rubbed over, and then exposed to the air, and afterwards baked in a baker's kiln, or assayer's oven.

MUFTI, or **MURTI**, the chief of the ecclesiastical order, or primate, of the mussulman religion. The authority of the musti is very great in the ottoman empire; for even the sultan himself, if he would preserve any appearance of religion, cannot, without hearing his opinion, put any person to death, or so much as inflict any corporal punishment. In all actions, especially criminal ones, his opinion is required, by giving him a writing, in which the case is stated, under feigned names; which he subscribes with the words, *He shall*, or *shall not be punished*. Such outward honour is paid to the musti, that the grand seignior himself rises up to him, and advances seven steps to meet him, when he comes into his presence. He alone has the honour of kissing the sultan's left shoulder, whilst the prime vizier kisses only the hem of his garment: when the grand seignior addresses any writing to the musti, he gives

him the following titles: "To the esad, the wisest of the wise; instructed in all knowledge; the most excellent of excellents; abstaining from things unlawful; the spring of virtue and true science; heir of the prophetic doctrines; resolver of the problems of faith; revealer of the orthodox articles; key of the treasures of truth; the light to doubtful allegories; strengthened with the grace of the supreme legislator of mankind; may the most high God perpetuate thy virtues." The election of the musti is solely in the grand seignior, who presents him with a vest of rich sables, &c. If he is convicted of treason, or any great crime, he is put into a mortar, kept for that purpose in the Seven Towers at Constantinople, and pounded to death.

MUGGLETONIANS, a religious sect, which arose in England, about the year 1657; so denominated from their leader Lodowick Muggleton, a journeyman taylor, who, with his associate Reeves, set up for great prophets, pretending, as it is said, to have an absolute power of saving and damning whom they pleased; and giving out, that they were the two last witnesses of God, that should appear before the end of the world.

MUGIL, in ichthyology. See **MULLET**.
MUG-WORT, in botany, the same with the artemisia. See **ARTEMISIA**.

Mug-wort has long been famous as an uterine and antispasmodic, and a medicine of great power in all diseases of the nerves. It is evidently aperient and abstergent: it promotes the menses, and cleanses the womb. It is given in decoction, or, much more agreeably, in a light infusion, in the manner of tea. The midwives use it externally, by boiling it, and applying it to the belly, to promote the menstrual discharge, or the expulsion of the secundines. It is by some much recommended as a cure for the sciatica, and is to be taken for this purpose, either in powder, two drams for a dose; or the expressed juice drank, an ounce or two, twice a day, for some months.

MUID, a large measure, in use among the french, for things dry. The muid is no real vessel used as a measure, but an estimation of several other measures, as the septier, mine, m-not, bushel, &c. See the article **MEASURE**.

MUID is also one of the nine casks, or regular vessels used in France, to put wine and

and other liquors in. The muid of wine is divided into two demi-muids, four quarter-muids, and eight half-quarter-muids, containing 36 septiers.

MUL, or MULL, one of the western islands of Scotland, being part of the shire of Argyle, and lying to the westward of it: this island is twenty-four miles long, and in some places as many broad.

MUL, or MULL of *Cantire*, the south cape or promontory of the county of Cantire or Mul, in the firth of Clyde, on the west of Scotland.

MUL, or MULL of *Galloway*, the south cape or promontory of all Scotland, in the county of Galloway, on the Irish sea.

MULATTO, a name given in the Indies to those who are begotten by a negro man on an indian woman, or an indian man on a negro woman.

MULBERRY, *morus*, in botany, a genus of the monoecia-tetrandria class of plants, having no corolla; the stamina are four subulated erect filaments, longer than the cup; there is no pericarpium; the cup is very large, carnosae, succulent, and baccated, containing a single ovato-acute seed.

The leaves of this tree are used for feeding silkworms, for which purpose it should not be allowed to grow tall, but kept in a sort of hedge; and instead of pulling off the leaves singly, they should be cut off with sheers, together with the young branches. See SILKWORM.

MULCT, a fine of money laid upon a man, who has committed some fault or misdemeanor.

MULCH, a term used by gardeners for rotten dung, or the like, thrown upon beds of young plants, to preserve them from the bad effects of cold or drought.

MULDAW, a river of Bohemia, that arises on the confines of Austria, and, running north, through Bohemia, unites with the Elbe at Melnick.

MULDORF, a town of Germany, in the circle of Bavaria, situated on the river Inn, forty miles east of Munich.

MULE, in zoology, a mongrel kind of quadruped; usually generated between an ass and a mare, and sometimes between a horse and a she-ass. The mule is a sort of a monster, of a middle nature between its parents, and therefore incapable of propagating its species; so careful is nature to avoid filling the world with monsters. Mules are chiefly used in countries where there are rocky and stony

roads, as about the Alps, Pyrenees, &c. Great numbers of them are kept in these places; they are usually black, strong, well limbed, and large, being mostly bred out of the fine spanish mares: the mules are sometimes fifteen or sixteen hands high. No creatures are so proper for carrying large burdens, and none so sure-footed. They are much stronger for draught than our horses, and are often as thick-set as our dray-horses; and they will travel several months together, with six or eight hundred weight upon their backs: they are much hardier and stronger than horses, and will live and work twice the age of a horse; and those mules which are light are fitter for riding than horses, as to the walk and trot; but they are apt to gallop rough.

MULHAUSEN, a town of Germany, in the landgravate of Alsace, situated on the river Ill, forty miles south of Strasbourg.

MULHAUSEN, is also a town of Germany, in the circle of upper Saxony, and territory of Thuringia, situated sixteen miles north-west of Sax gotha.

MULIEBRIA, a term used to signify the privities of women.

MULIER, in law, signifies the lawful issue born in wedlock, though begotten before. The mulier is preferred to an elder brother born out of matrimony; as, for instance, if a man has a son by a woman before marriage, which issue is a bastard, and afterwards marries the mother of the bastard, and they have another son, this second son is mulier and lawful, and shall be heir of the father, but the other can be heir to no person. See the article BASTARD.

By the civil law, where a man has issue by a woman, if after that he marries her, the issue is mulier.

MULIERTY, signifies the condition of a mulier, or lawful issue.

MULLER, or MULLAR, denotes a stone flat and even, at the bottom, but round a-top, used for grinding of matters on a marble. The apothecaries use mullers to prepare some of their testaceous powders, and painters for their colours, either dry or in oil.

Muller is also an instrument used by the glass-grinders; being a piece of wood, to one end whereof is cemented the glass to be ground. It is ordinarily about six inches long, turned round. See the article GLASS-GRINDING.

MULLERAS, a town of Germany, in the circle of Upper Saxony, and marquisate of Brandenburg, situated thirty-eight miles south-east of Berlin.

MULLET, *mugil*, in ichthyology, a genus of the acanthopterygeous fishes, the head of which is of a depressed form in the anterior part, and the body oblong and compressed. On each side of the head, below the nostrils, there stands a little bone, which is serrated on its lower part; the eyes are not covered with a skin; and there are teeth on the tongue and palate, but none in the jaws or fauces; the branchiostegic membrane on each side contains six ossicles; these are of a crooked figure, and the upper one, which is the broadest, is covered by the coverings of the gills in such a manner, that only five appear.

MULLET is also a name for several species of the trigla. See **TRIGLA**.

MULLET, or **MOLLET**, in heraldry, a bearing in form of a flat, or rather of the rowel of a spur, which it originally represented.

The mullet has but five points; when there are six it is called a star; tho' others make this difference, that the mullet is, or ought to be always pierced, which a star is not. See plate CLXXXI. fig. 2.

The mullet is usually the difference or distinguishing mark for the fourth son, or third brother, or house; though it is often borne alone, as coat-armour.

MULLUS, the same with mullet. See the article **MULLET**.

MULSUM, **MULSE**, a liquor made of wine and honey, or even of wine and water. See the article **HYDROMEL**.

MULTA, or **MULTURA EPISCOPI**, is said to be a satisfaction antiently made to the king by the bishops, in order that they might have power to make their last wills and testaments; and have the probate of the wills of other men, and also the granting of administrations.

MULTAN, or **MOUTAN**, a city of hither India in Asia, capital of the province of Multan, situated on the river Indus, east long. $72^{\circ} 15'$, north lat. 30° .

MULTANGULAR, a figure, or body, which has many angles.

MULTILATERAL, in geometry, is applied to those figures which have more than four sides or angles, more usually

called polygons. See the article **POLYGON**, **MULTINOMIAL**, or **MULTINOMIAL ROOTS**, in mathematics, such roots as are composed of many names, parts, or members; as $a + b + d + c$, &c. See the article **ROOT**.

MULTIPLE, *multiplex*, in arithmetic, a number which comprehends some other several times, thus 6 is a multiple of 2, and 12 is a multiple of 6, 4, and 3, comprehending the first twice, the second thrice, &c.

MULTIPLE RATIO, or **PROPORTION**, is that which is between multiples. If the lesser term of the ratio be an aliquot part of the greater, the ratio of the greater to the less is called multiple; and that of the less to the greater submultiple. A submultiple number is that contained in the multiple; thus, the numbers 1, 2, and 3, are submultiples of 9. Duple, triple, &c. ratios, as also subduples, subtriples, &c. are so many species of multiple and submultiple ratios. See the article **RATIO**.

MULTIPPLICAND, in arithmetic, one of the factors in the rule of multiplication; being that number which is given to be multiplied by another, which is called the multiplier, or multiplier.

MULTIPLICATION, in general, the act of increasing the number of any thing.

Multiplication, in arithmetic, is a rule by which any given number may be speedily increased, according to any proposed number of times.

Multiplication, which is the fourth rule in arithmetic, serves instead of many additions; the product of a multiplication being only the repetition of the multiplicand so many times, as there are units in the multiplier.

Case I. To multiply single numbers by one another.

All the variety that can happen in this case is expressed in the following table of multiplication, which must be perfectly got by heart, for the ready performance of any operation in multiplication: thus we learn, by the table, that 3 times 3 is 9; that 3 times 6 is 18, &c. We have in this table, omitted multiplying with 2, it being so very easy that any one may do it.

MULTIPLICATION TABLE.

| | | | | | |
|--------|--------|--------|--------|--------|--------|
| 3×3=9 | 4×4=16 | 5×5=25 | 6×6=36 | 7×7=49 | 8×8=64 |
| 3×4=12 | 4×5=20 | 5×6=30 | 6×7=42 | 7×8=56 | 8×9=72 |
| 3×5=15 | 4×6=24 | 5×7=35 | 6×8=48 | 7×9=63 | 9×9=81 |
| 3×6=18 | 4×7=28 | 5×8=40 | 6×9=54 | | |
| 3×7=21 | 4×8=32 | 5×9=45 | | | |
| 3×8=24 | 4×9=36 | | | | |
| 3×9=27 | | | | | |

Case II. To multiply a compound number by a single one.

Rule. Having placed the multiplier under the unit's place of the multiplicand; first, multiply the unit of the multiplicand by the multiplier; if their product be less than ten, set it down underneath its own place of units, and proceed to the next figure of the multiplicand: but if their product be above ten, or tens, then set down the overplus only, or odd figure, as in addition, and carry the said ten or tens in mind, till you have multiplied the next figure of the multiplicand with the multiplier: then, to their product add the ten or tens beared in mind, setting down the overplus of their sum above the tens, as before; and so proceed in that manner until all the figures of the multiplicand are multiplied with the multiplier.

Example. Suppose it were required to multiply 3213 by 3.

3213 Multiplicand.
3 Multiplier.

9639

Example 1. Let it be required to multiply 78094 by 7563.

The operation. 78094 Multiplicand.

7563 Multiplier.

234282 The first particular product with 3.

468564 The second particular product with 60.

390470 The third particular product with 500.

546658 The fourth particular product with 7000.

590624922 The total, or true product required.

When there is a cypher or cyphers to the right hand, either of the multiplicand or multiplier, or to both, in that case, multiply the figures as before, neglecting the cyphers until the particu-

For, beginning at the unit's place 3, say 3 times 3 is 9, which, because it is less than ten, set down underneath its own place, and proceed to the next place of tens, saying 3 times 1 is 3, which set down underneath its own place; then at the next place, viz. of hundreds, say 3 times 2 is 6, which set down as before; lastly, at the place of thousands, say 3 times 3 is 9, which being set down underneath its own place, the operation is finished, and the true product is 9639.

Case III. To multiply one compound number by another.

Rule. Place every number respectively under its own kind: multiply each figure of the multiplicand by each figure of the multiplier as before; and observe to set the first figure of each respective product under that figure of the multiplier, by which it was made; lastly, add the several products together for the whole product.

lar products are added together; then to their sum annex so many cyphers as there are in either or both the factors, as in the following examples.

Example 2.

9538
4600
57228
38152
43874800

Example 3.

87600
79
7884
6132
6920400

Example 4.

785000
56900
7065
4710
3925
44666500000

If

If it be required to multiply any number by 10, 100, 1000, 10000, &c. it is only annexing the cyphers of the multiplier to the figures of the multiplicand, and the work is done: thus $578 \times 10 = 5780$, $578 \times 100 = 57800$, $578 \times 1000 = 578000$, $578 \times 10000 = 5780000$, &c. If a quantity be multiplied by the component part of the multiplier, the product will be the same as if it had been multiplied by the multiplier itself: thus, 245 by 7, and the product by 6 is the same as if 245 was multiplied by 7×6 , that is by 42.

For the proof of multiplication, it is to be observed that the product is then right when being divided by the multiplier it quotes the multiplicand; or divided by the multiplicand it quotes the multiplier. See the article DIVISION.

Cross MULTIPLICATION, otherwise called duodecimal arithmetic, is an expeditious method of multiplying things of several species, or denominations, by others likewise of different species, &c. *e. g.* Shillings and pence, by shillings and pence; feet and inches, by feet and inches.

This is much used in measuring, &c. and the method is thus:

Suppose 5 feet 3 inches to be multiplied by 2 feet 4 inches; say F. I.
 2 times 5 feet is 10 feet, and 2 times 3 is 6 inches; again, say 4 times 5 is 20 inches, or 1 foot 8 inches; and 4 times 3 is 12 parts, or 1 inch: the whole sum makes 12 feet 3 inches. In the same manner you may manage shillings and pence, &c.

For the multiplication of vulgar and decimal fractions, see the articles FRACTION and DECIMAL.

MULTIPLICATION, in algebra. The general rule for the signs is, that when the signs of the factors are alike (*i. e.* both + or both -) the sign of the product is +; but when the signs of the factors are unlike, the sign of the product is -.

Case 1. When any positive quantity, $+a$, is multiplied by any positive number, $+n$, the meaning is, that $+a$ is to be taken as many times as there are units in n ; and the product is evidently na .

Case 2. When $-a$ is multiplied by n ,

$$\begin{array}{r} \text{Mult. } a + b \\ \text{By } a + b \\ \hline \text{Prod. } \left\{ \begin{array}{l} aa + ab \\ + ab + bb \end{array} \right. \\ \hline \text{Sum } aa + 2ab + bb \end{array}$$

then $-a$ is to be taken as often as there are units in n ; and the product must be $-na$.

Case 3. Multiplication by a positive number implies a repeated addition: but multiplication by a negative implies a repeated subtraction. And, when $+a$ is to be multiplied by $-n$, the meaning is that $+a$ is to be subtracted as often as there are units in n : therefore the product is negative, being $-na$.

Case 4. When $-a$ is to be multiplied by $-n$, then $-a$ is to be subtracted as often as there are units in n ; but to subtract $-a$ is equivalent to adding $+a$, consequently the product is $+na$. The second and fourth cases may be illustrated in the following manner:

It is evident that $+a - a = 0$; therefore if we multiply $+a - a$ by n , the product must vanish or be 0, because the factor $a - a$ is 0. The first term of the product is $+na$ (by case 1.) Therefore, the second term of the product must be $-na$, which destroys $+na$; so that the whole product must be $+na - na = 0$. Therefore, $-a$ multiplied by $+n$ gives $-na$.

In the like manner, if we multiply $+a - a$ by $-n$, the first term of the product being $-na$, the latter term of the product must be $+na$, because the two together must destroy each other, or their amount 0, since one of the factors (*viz.* $a - a$) is 0. Therefore, $-a$ multiplied by $-n$ must give $+na$.

If the quantities to be multiplied are simple, find the sign of the product by the last rule; after it place the product of the co-efficients, and set down all the letters after one another as before.

EXAMPLES.

$$\begin{array}{r} \text{Mult. } +a \quad | \quad -2a \quad | \quad +6x \\ \text{By } +b \quad | \quad +4b \quad | \quad -5a \\ \hline \text{Product } +ab \quad -8ab \quad -30ax. \end{array}$$

$$\begin{array}{r} \text{Mult. } -8x \quad | \quad +3ab \\ \text{By } -4a \quad | \quad -5ac \\ \hline \text{Product } +32ax \quad -15aabc. \end{array}$$

To multiply compound quantities, you must multiply every part of the multiplicand by all the parts of the multiplier taken one after another, and then collect all the products into one sum; the sum shall be the product required.

$$\begin{array}{r} 2a - 3b \\ 4a + 5b \\ \hline \left\{ \begin{array}{l} 8aa - 12ab \\ + 10ab - 15bb \end{array} \right. \\ \hline 8aa - 2ab - 15bb \end{array} \quad \text{Mult.}$$

| | | |
|-------|--|---|
| Mult. | $2a - 4b$ | $xx - ax$ |
| By | $2a + 4b$ | $x + a$ |
| Prod. | $\begin{array}{r} 4aa - 8ab \\ + 8ab - 16bb \end{array}$ | $\begin{array}{r} xxx - axx \\ + axx - aax \end{array}$ |
| Sum | $4aa \dots 0 - 16bb$ | $xxx \dots 0 - aax$ |

| | |
|-------|---|
| Mult. | $aa + ab + bb$ |
| By | $a - b$ |
| Prod. | $\begin{array}{r} aaa + aab + abb \\ - aab - abb - bbb \end{array}$ |
| Sum | $aaa \dots 0 \dots 0 \dots 0 - bbb$ |

Products that arise from the multiplication of 2, 3, or more quantities as abc , are said to be of 2, 3, or more dimensions; and those quantities are called factors or roots.

If all the factors are equal, then these products are called powers; as aa or aaa are powers of a . Powers are expressed sometimes by placing, above the root to the right hand, a figure expressing the number of factors that produce them, thus:

| | | | |
|---------|-----|----------------|-------|
| a | 1st | power of the | a |
| aa | 2d | root a , and | a^2 |
| aaa | 3d | is generally | a^3 |
| $aaaa$ | 4th | expressed | a^4 |
| $aaaaa$ | 5th | thus: | a^5 |

These figures which express the number of factors that produce powers are called their indices or exponents; thus 2 is the index of a^2 . And powers of the same root are multiplied by adding their exponents thus: $a^2 \times a^3 = a^5$, $a^4 \times a^3 = a^7$. $a^3 \times a = a^4$.

Sometimes it is useful not actually to multiply compound quantities, but to set them down upon the sign of Multiplication (\times) between them, drawing a line over each of the compound factors. Thus $a + b \times a - b$ expresses the product of $a + b$ multiplied by $a - b$.

MULTIPLICATION of surds. See SURDS.

MULTIPLICATOR, or MULTIPLIER, in arithmetic, a number multiplying another called the multiplicand. See MULTIPlicAND and MULTIPlicATIOn.

The larger number is generally made the multiplicand, and is placed above the smaller, or multiplier: but the result is the same, which soever of the numbers be made multiplicand, or multiplier.

MULTIPLYING GLASS, in optics, one wherein objects appear increased in number.

It is otherwise called a polyhedron, being ground into several planes, that make angles with each other; through which

the rays of light issuing from the same point undergo different refractions, so as to enter the eye from every surface in a different direction.

MULTISILIKUOUS PLANTS, those which have after each flower many distinct, long, slender, filiquæ or pods, in which their seed is contained: such are bear's foot, columbine, house-leek, navel-wort, orpine, &c.

MULTITUDE, an assemblage, or collection of a great number of distinct persons or things: thus we say, a multitude of men, of horses, of trees, &c. The units, or individuals, that make a multitude, may be of the same or different kinds, and natures of things; and that whether they are really separated from one another, or only distinguished by the imagination.

MULTIVALVES, in natural history, the name of a general class of shell-fish distinguished from the univalves, which consist of only one shell, and the bivalves, which consist of two, by their consisting of three or more shells. See SHELL, UNIVALVES, and BIVALVES.

Of these there are much fewer species, than either of the univalve or bivalve class. A late accurate French author has ranked all the species under six genera, which are these: 1. The *echini* or sea-eggs. 2. The *vermiculi* or sea-worms. 3. *Balani* or center-shells. 4. The *polipicides* or thumb-shells. 5. The *concha anatiferæ* or goose-shells. And 6. The *pholades*.

MULVIA, a river of Barbary, in Africa, which rises in the mountains of Atlas, and divides the empire of Morocco from the kingdom of Algiers, and then falls into the Mediterranean, west of Mar-salquiver.

MUM, a kind of malt-liquor, much drank in Germany; and chiefly brought from Brunswick, which is the place of most note for making it. The process of brew-

ing.

ing mum, as recorded in the town-house of that city, is as follows: Take sixty-three gallons of water that has been boiled till one-third part is consumed, and brew it with seven bushels of wheaten-malt, one bushel of oat-meal, and one bushel of ground beans; when it is tunned, the hogthead must not be filled too full at first; as soon as it begins to work, put into it three pounds of the inner rind of fir; one pound of the tops of fir and beach; three handfuls of carduus benedictus; a handful or two of the flowers of rosa solis; add burnet, betony, marjoram, avens, penny-royal, and wild thyme, of each a handful and a half; of elder-flowers, two handfuls or more; seeds of cardamum bruised, thirty ounces; barberries bruised, one ounce; when the liquor has worked a while, put the herbs and seeds into the vessel; and, after they are added, let it work over as little as possible; then fill it up: lastly, when it is stopped, put into the hogthead ten new-laid eggs unbroken; stop it up close, and drink it at two years end. Our english brewers, instead of the inner rind of fir, use cardamum, ginger, and saffrafrs; and also add elecampane, madder, and red-sanders. Mum, on being imported, pays for every barrel 1 l. 5 s.

MUMMY, a body embalmed or dried, in the manner used by the antient Egyptians: or the composition with which it is embalmed. There are two kinds of bodies denominated mummies: the first are only carcases dried by the heat of the sun, and by that means kept from putrefaction: These are frequently found in the sands of Lybia. Some imagine, that these are the bodies of deceased people buried there on purpose to keep them intire without embalming; others think they are the carcass-s of travellers, who have been overwhelmed by the clouds of sand raised by the hurricanes frequent in those deserts. The second kind of mummies are bodies taken out of the catacombs, near Cairo, in which the Egyptians deposited their dead after embalming. For a further account of mummies, and the manner of embalming dead bodies, see EMBALMING.

We have two different substances preserved for medicinal use under the name of mummy, though both in some degree of the same origin: the one is the dried and preserved flesh of human bodies, embalmed with myrrh and spices;

the other is the liquor running from such mummies, when newly prepared, or when affected by great heat or damps. This latter is sometimes in a liquid; sometimes of a solid form, as it is preserved in vials well stopped, or suffered to dry and harden in the air. The first kind of mummy is brought to us in large pieces, of a lax and friable texture, light and spongy, of a blackish brown colour, and often damp and clammy on the surface: it is of a strong but disagreeable smell. The second kind of mummy in its liquid state, is a thick opaque and viscous fluid, of a blackish colour, but not disagreeable smell. In its indurated state, it is a dry solid substance, of a fine shining black colour, and close texture, easily broken, and of a good smell; very inflammable, and yielding a scent of myrrh, and aromatic ingredients while burning. This, if we cannot be content without medicines from our own bodies, ought to be the mummy used in the shops; but it is very scarce and dear, while the other is so cheap, that it will always be most in use.

All these kinds of mummy are brought from Egypt, but we are not to imagine, that any body breaks up the real egyptian mummies, to sell them in pieces to the druggists, as they may make a much better market of them in Europe whole, when they can contrive to get them. What our druggists are supplied with, is the flesh of executed criminals, or of any other bodies the Jews can get, who fill them with the common bitumen, so plentiful in that part of the world; and adding a little aloes, and two or three other cheap ingredients, send them to be baked in an oven, till the juices are exhaled, and the embalming matter has penetrated so thoroughly that the flesh will keep, and bear transporting into Europe. Mummy has been esteemed resolvent and balsamic; but whatever virtues have been attributed to it, seem to be such as depend more upon the ingredients used in preparing the flesh, than in the flesh itself; and it would surely be better to give those ingredients without so shocking an addition.

Besides the mummy, the human body has been made to furnish many other substances for medicinal purposes: Thus the skull has been celebrated for its imaginary virtues against the diseases of the head: the very moss growing on the skulls of human skeletons, has been supposed

posed to possess anti-epileptic virtues: the fat of the human body has been recommended as good in rheumatisms; and the blood, and in short, every other part or humour of the body, have, at one time or other, been in repute for the cure of some disease: but at present we are grown wise enough to know, that the virtues ascribed to the parts of the human body are either imaginary, or such as may be found in other animal substances. The mummy, and skull alone, of all these horrid medicines, retain their places in the shops; and it were to be wished that they too were rejected.

MUMMY, among gardeners, a kind of wax used in grafting and planting the roots of trees, made in the following manner: Take one pound of black pitch, and a quarter of a pound of turpentine; put them together into an earthen pot, and set them on fire in the open air, holding something in your hand to cover and quench the mixture in time, which is to be alternately lighted and quenched till all the nitrous and volatile parts be evaporated. To this a little common wax is to be added; and the composition is then to be set by for use.

Dr. Agricola directs its being used in planting pieces of the roots of trees, in the following manner: melt it, and having let it cool a little, dip in the two ends of the pieces of root, one after another; then put them in water, and plant them in the earth, the small end downward, so that the larger may appear a little way out of the earth, in order to have the benefit of the air; then press the earth hard down about them, that they may not receive too much wet. This work he recommends to be performed in the months of September, October, and November.

This author recommends several other kinds of mummies, but as the ingredients are much the same, it would be to little purpose to insert them.

MUNDIC, in natural history, a metallic mineral, more commonly called marcasite. See the article **MARCASITE**.

MUNDIFICATIVES, in pharmacy, the same with cleansers or detergents. See **DETERGENTS** and **VULNERARY**.

MUNGATS, or **MUNKATS**, a town of upper Hungary: east long. 22° , north lat. $48^{\circ} 30'$.

MUNGO, or **MUNGATHIA**, an animal of the ferret-kind, of a reddish grey colour.

VOL. III.

MUNICH, or **MUNCHEN**, a large and elegant city, the capital of the electorate and dutchy of Bavaria, situated on the river Iser: east long. $11^{\circ} 32'$, north lat. $48^{\circ} 5'$.

MUNICIPAL, in the roman civil law, an epithet which signifies invested with the rights and privileges of roman citizens. Thus the municipal cities were those whose inhabitants were capable of enjoying civil offices in the city of Rome: these cities, however, according to Mariana, had fewer privileges than the colonies: they had no suffrages or votes at Rome: but were left to be governed by their own laws and magistrates. Some few municipal cities, however, obtained the liberty of votes.

Municipal, among us, is applied to the laws that obtain in any particular city or province. And those are called municipal officers who are elected to defend the interest of cities, to maintain their rights and privileges, and to preserve order and harmony among the citizens. Such as mayors, sheriffs, consuls, &c.

MUNIMENTS, or **MINIMENTS**, the writings relating to a person's inheritance, by which he is enabled to defend his title to his estate; or, in a more general sense, all manner of evidences, such as charters, feofments, releases, &c.

MUNIMENT HOUSE, a little strong room in a cathedral, college, or university, destined for keeping the seal, charters, &c. of such cathedral, college, &c.

MUNIONS, in architecture, are the short, upright posts or bars which divide the several lights in a window frame.

MUNITION, the provisions with which a place is furnished in order for defence; or that which follows a camp for its subsistence. See **AMMUNITION**.

MUNITION SHIPS, are those that have stores on board in order to supply a fleet of men of war at sea. In an engagement, all the munition ships, and victuallers attending the fleet, take their stations in the rear of all the rest; they are not to engage in the fight, but to attend such directions as are sent them by the admiral.

MUNSTER, the capital of the bishopric of the same name, and of the circle of Westphalia, situated on the river Aa: east long. $7^{\circ} 10'$, north lat. 52° .

MUNSTER, is also a town of Germany, in the Landgraviate of Alsatia, subject to France: east long. $7^{\circ} 5'$, north lat. $48^{\circ} 8'$.

MUNSTER MEINFELT, a town of Germany, many,

many, in the circle of the lower Rhine, and electorate of Triers: east long. 7° , north lat. $50^{\circ} 15'$.

MUNSTERBERG, the capital of the dutchy of the same name in Silesia: east long. $16^{\circ} 40'$, north lat. $50^{\circ} 35'$.

MUNTINGIA, in botany, a genus of the polyandria-monogynia class of plants, the corolla whereof consists of five roundish petals, of the length of the cup; they are patent, and are inserted in the cup; the fruit is a round unilocular berry, umbilicated with the stigma; the seeds are numerous, roundish, and small.

MUPHTI. See the article MUFTI.

MURÆNA, in ichthyology, a genus of the malcopterigious class of fishes, the body of which is long, slender, and rounded; or subcylindric in some species: the fins are three, in others they are four, and in some again there is only one; at the very extremity of the rostrum there are two short tubes or foramina, one on each side, and these are the anterior apertures of the nostrils; the branchiole membrane on each side contains ten slender and crooked bones, but the skin of the flesh is thick and firm; so that till it is taken off, they are not easily discovered. This genus contains the common eel, and the conger or sea-eel. See EEL.

The other species of this genus are the sea serpent, the flat-tailed sea-serpent, the spotted sea-serpent, and the muræna simply so called. The sea serpent is the cylindric muræna, with the tail naked and acute, and has vastly the appearance of the serpent kind; it grows to five feet in length, and to the thickness of a man's wrist; the head is small and the rostrum acute, but the opening of the mouth is very large, and furnished with a vast number of very sharp and strong teeth, of unequal sizes; the eyes are small, their iris of a gold-yellow, and the pupil round and black; the pectoral fins stand just at the opening of the gills, are very small, and have each sixteen rays. The flat-headed sea-serpent is the muræna, with the snout sharp and spotted with white, and with the edge of the back fin black; this has much the general resemblance of the common eel, it grows to between three and four feet in length, and as thick as a man's wrist. The spotted sea-serpent is the slender spotted muræna, with a pointed naked tail, growing to four feet in length, and not thicker than an eel of but two and a half. The muræna simply so called,

is that with no pectoral fins, being a singular species, having only one fin, which is the pinna dorsi, surrounding the tail and running up to the anus; it grows to two feet in length, and to the thickness of an eel of the same length.

MURAGE, a toll taken of every cart or horse coming laden into a city, for repairing the walls.

MURAL, in general, any thing belonging to a wall, which the latins call murus.

MURAL ARCH, is a wall, or walled arch, placed exactly in the plane of the meridian, for fixing a large quadrant, sextant, or other instrument, in order to observe the meridian altitudes of the heavenly bodies.

MURAL CROWN. See the article CROWN.

MURCIA, the capital of the province of the same name in Spain: west long. $1^{\circ} 12'$, north lat. $38^{\circ} 6'$.

MURDER, or MURTHUR, in law, is the wilful and felonious killing a person from premeditated malice; provided the party wounded or otherwise hurt, die within a year and a day after the fact was committed.

It is malice, and not the bare killing that constitutes the crime of murder, which is either expressed or implied; expressed, when it is proved that there was some ill will, or grudge, before the killing, and that the fact was done with a sedate mind, and a formed design of doing it: and implied, where a person kills another suddenly, having nothing to defend himself, as in going along a street, over a field, or the like. That murder which is perpetrated through a direct purpose to do some personal injury to the person slain, is said to be of express malice; and such as happens in the execution of an illegal action, that was principally designed for some other purpose, and not manifested in its nature to do a personal injury to him who is killed, is most properly malice implied. Where a person voluntarily commits any violent or cruel act, which is attended with death, in the eye of the law he is looked upon as doing it out of malice aforethought; as where a man in cool blood maliciously beats another, in such a manner, beyond any apparent design of chastisement, that he dies: this is murder by express malice, though there is no other proof that he intended to kill him. Where a person declares a resolution to kill the first man he meets, and does kill him, it is murder; because in this case malice is implied

implied against all mankind. Where two or more persons assemble together, in order to commit some unlawful act, and one of them, by chance, kills another; this is murder in all that are present; and such persons are construed to be present, if they are in the same house, though in another room; or if in the same park, tho' they are half a mile off. Where poison is laid, in order to kill a particular person, and another accidentally takes it, and dies, it is murder in the person who laid the poison. See the article MANS LAUGHTER.

By a late act, all persons found guilty of wilful murder, are to be executed on the day next but one after sentence passed, unless that day happens to be a Sunday; and in that case, they are to be executed on the Monday following. The judge may direct the body to be hung in chains, or to be delivered to the surgeons, in order to its being dissected and anatomized; but in no case whatsoever is it to be buried, till after it is dissected.

MURDERERS, or MURDERING PIECES, in a ship, are small pieces of ordnance, either of brass or iron, which have chambers put in at their breeches. They are used at the bulk-heads of the fore-castle, half-deck, or steerage, in order to clear the deck, on the ship's being boarded by an enemy.

MURENGERS, two officers of great antiquity in the city of Chester, annually chosen out of the aldermen; to see that the walls are kept in repair, and to receive a certain toll and custom, for the maintenance thereof.

MURET, a town of France, in the province of Gascony, twelve miles south of Toulouse.

MUREX, in natural history, a genus of univalve or simple shells, without any hinge, formed of a single piece, and beset with tubercles or spines: the mouth is large and oblong, and has an expanded lip, and the clavicle is rough.

The animal, which inhabits this shell, is called limax, or snail. See SNAIL.

The clavicle of the murex is in some species elevated, in others depressed; and the mouth is sometimes dentated, and at others smooth: the lip also in some is digitated, in others elated, and in some lacinated; and the columella is in some smooth, in others rugose.

Of this genus there are a great many very elegant species, among which is, the spider-shell, or rugose murex, with

a protended lip, and six long cornicles, or legs; which grows to three inches in length, and two and a half in diameter; its general colour being a tawny brown, variegated with darker clouds: and the ribbed music-shell, or obscurely costated murex, with striated zones: it is about two inches long, and near an inch and half in diameter; its ground-colour is a whitish brown, and it is surrounded with three or four elegant zones, formed of four or five parallel black lines, with spots of a blackish or redish colour between them; resembling very much the lines in which music is written, with the marks of crotchets, &c. whence the name. There is also a lesser music-shell, rather more elegant than the former.

MURING, among builders, the raising of walls. See the article WALL.

MURIA, ALIMENTARY SALT, in natural history. See the article SALT.

MURO, a town of Italy, in the kingdom of Naples, sixty miles south-east of the city of Naples.

MURRAIN, or GARGLE, a contagious disease among cattle, principally caused by a hot dry season, or rather by a general putrefaction of the air, which begets an inflammation of the blood, and a swelling in the throat, that soon prove mortal, and is communicated from one to another, though it generally goes no farther than to those of the same kind.

The symptoms of this disease are a hanging down and swelling of the head, abundance of gum in the eyes, rattling in the throat, a short breath, palpitation at the heart, staggering, a hot breath, and a shining tongue.

In order to prevent this disease, the cattle should stand cool in summer, have plenty of good water; all carrion should be speedily buried, and as the feeding of cattle in wet places, on rotten grass and hay, often occasions this disease, dry and sweet fodder should be given them. The following receipt is much recommended for the cure of this disease in black cattle: Take diapente, a quarter of an ounce; dialthæa or marshmallows, london treacle, mithridate and rhubarb, of each the quantity of a nut; of saffron, a small quantity; wormwood, and red sage, of each an handful; and two cloves of garlick: boil all together in two pints of beer, till it be reduced to a pint and a half, and give it the beast luke-warm, while fasting: half the proportion will serve for a cow; they must be kept warm,

and take a mash of ground malt, drinking warm water for a week, and sometimes have boiled oats. If sheep are troubled with this distemper, give them a few spoonfuls of brine, and then a little tar.

MURRAY, a county of Scotland, bounded by the German Sea, on the north; by Bamf, on the east; by Mar and Badenoch, on the south; and by Inverness, on the west.

MURREY, in heraldry, a kind of purple colour. See the article **SANGUINE**.

MURRHINE, or **MORRHINE VESSELS**, in antiquity, a kind of porcellain-ware, used in cups and vases; though some will have them to have been made of a precious stone, of the agate-kind.

There were also murrhine vessels, made at Diospolis, in Egypt; which was a kind of glass-ware, made in imitation of the true sort, brought from India.

MURTHUR, or **MURDER**. See **MURDER**.

MURTHURING PIECES, or **MURDERERS**. See the article **MURDERERS**.

MUS, in zoology, a genus of quadrupeds, of the order of the *agriæ*, the characters of which are these: the fore-teeth are acute, and there are no canine teeth at all; the feet are divided, and the ears naked.

Of this genus there are a great many species, known by distinct english names; as the rat, mouse, dor-mouse, or *forex*, citille, agutis, guinea-pig, &c. See the article **RAT**, **MOUSE**, &c.

MUSA, the **PLANTAIN-TREE**, in botany, a genus of the *polygamia* class of plants, the flower of which consists of two petals; one of which is erect, and divided by five indentings at the edge; and the other is hollow, shorter, and nectariferous: the stamina are six; and the fruit is an oblong, triquetrous berry.

MUSCA, the **FLY**, in zoology. See **FLY**.

MUSCÆ VOLITANTES, certain dark spots, seen by many people on looking at the sky, a candle, or other bright object; so called from their resembling flies. See the article **EYE**.

MUSCADINE, a rich kind of wine, of the growth of Provence and Languedoc, in France. See the article **WINE**.

MUSCLE, *musculus*, in anatomy, a part of the human body, destined to move some other part, and that in general by a voluntary motion, or such as is dictated by the will; being composed principally of flesh and tendinous fibres, which have also vessels of all kinds, as arteries, veins, nerves, and lymphatics; all which

are surrounded by, or enclosed in, one common membrane.

The muscular fibres are, according to the action they are intended for, of various directions; some streight, others oblique, transverse, annular, and spiral. Some consist of one uniform series of fibres, and on that account are called simple; others are composed of various, and often contrary courses of fibres, and these being closely arranged together, the large one seems to be made up of a number of lesser muscles, and is therefore called compound; and the more of these clusters of fibres, or smaller vessels, enter into the composition of a larger one, the thicker and stronger it is.

A muscle is divided, by anatomists, into the body, and the two extremities; the body *c* (plate **CLXXXIV**. fig. 2.) is also called the venter or belly of the muscle; and the two extremities, if white, are called tendons; whereof that marked *a* is the right, and *b* the left. Fig. 3. *ibid.* represents a simple muscle opened, to shew the internal series of fleshy fibres: and fig. 4. exhibits a section of a regular compound muscle, shewing the arrangement of fibres in each belly. That extremity where the muscle arises, is called its head, caput; or its beginning, origin, or fixed point: and its other extremity, or end, is called its tail, moveable point, and often its tendon; and, finally, if this be broad and membranous, it is called an aponeurosis.

In many of the muscles, both the extremities are moveable; in these, that part which of the two is least moveable, is always called the head, and the more moveable part the tail. This, however, cannot be done universally; since there are cases in which that extremity of a muscle, which was before the moveable point, becomes the fixed point; and *vice versa*, as in the *ferrati antici*, and some of the muscles of the abdomen, not to mention any others.

Action of the MUSCLES. This consists in the contraction of its belly, after whatever manner that is done: by this means its extremities approach toward each other; and, by this means also, the part in which the end of the muscle is inserted, moves as if it were drawn by a cord. Schelhammer is of opinion, that this contraction of the belly of the muscle is effected by a corrugation of the fibres, in the same manner as we see an earth-worm shorten and contract itself by corrugating

Fig. 1. MUSCLES
of the fore part of the
Human Body.

This anatomical engraving shows the front of a human figure with muscles exposed. Numerous numbers (1-61) are placed around the figure, with dashed lines pointing to specific muscles or anatomical features. The figure is standing with arms slightly away from the body. The head, neck, and upper torso are at the top, with the legs extending downwards. The muscles of the arms, chest, abdomen, and legs are clearly delineated with fine lines and shading.

Fig. 2. A Simple Muscle

This engraving shows a single, elongated muscle with a central tendon. It is shown in a slightly curved, relaxed state. The muscle fibers are represented by fine, parallel lines, and the tendon is a thicker, more central structure.

Fig. 3. A Simple Muscle laid open

This engraving shows a simple muscle laid open, revealing its internal structure. The muscle is shown in a longitudinal section, with the internal fibers and the central tendon clearly visible. The edges of the muscle are slightly flared out.

Fig. 4. A Compound Muscle laid open

This engraving shows a compound muscle laid open, revealing its internal structure. The muscle is shown in a longitudinal section, with multiple internal compartments or lobes visible, separated by connective tissue. The overall shape is more complex than the simple muscle shown in Fig. 3.

Fig. 4. A Compound Muscle laid open.



rugating its skin, &c. Morgagni, on the other hand, alledges, that in order to understand the power of motion in a muscle, we ought to attend to Wallis's experiment; by which it is evidently proved, that the smallest force imaginable of the air, driven through a cylindric tube into a bladder, will, by distending its width, and shortening its length, cause it to rise up, and sustain a weight of sixty or seventy pounds.

Others have demonstrated, from hydrostatical principles, that a very small quantity of a fluid, directed through a small cylindric tube, placed in a vessel of a larger base, and already filled, will be able, in the same manner, to move and raise up a large weight; from whence they conclude, that the belly of a muscle swells in the time of its contraction or action; and that this intumescence may, nay and must, have very great effects.

On the other hand, there are, among the latest and most celebrated writers, some who affirm that the belly of a muscle does not swell or become distended at all in the time of its contraction. But it would be well, says Heister, if the asserters of this opinion would, while they forcibly draw up the under jaw to the upper, lay two or three of their fingers upon either the temporal or masseter muscle; for, in this case, they would see the most evident of all conviction, that, while these muscles act, their bellies are in reality distended, and rendered firmer. Or let them only, when the hand is placed in a proper situation, forcibly draw the thumb towards the first finger, and then they may both see and feel, that the muscle between the thumb and the index swells, or is distended in its middle, as the action of drawing the thumb is performed. The reader who would enter more deeply into this disquisition, may consult Borelli de Motu animalium; Bernouilli de Motu muscul. Berger's Physiolog. c. 22. Boerhaave's Institutes, chap. of muscular motion; and Mead's Introduction to Cowper's Myographia.

Among the muscles, there are different ones that conspire in the same action, and so perform the same motion as associates: such are the flexors or extensors of the arm, and the like: hence these, and such others as conspire in the same manner to the same action, are called by authors *focii* and *congeneres*.

When, on the other hand, we regard

the contrary actions of certain muscles, as the extensors of any part which act quite contrary to the flexors, these are called antagonist muscles; in this case both the kinds acting together, render the limbs rigid or immovable: this action of the muscles is called *motus tonicus*. It is also observable, that several of the muscles, considered singly and separately, perform other kinds of motions besides those ascribed to them in regard to the whole part: thus the mastoide muscle, the rectus major capitis, &c. when they act on both sides, bend the head forwards; but when only on one side, they draw the head obliquely downwards, and to one side. Hence, from the diversity of the muscles, which act either alone or conjunctly with their associates, or with others, there arise several intermediate motions, quite different from the primary ones, and such as have not hitherto been sufficiently observed. This does not only happen in regard to the muscles of the head, the flexors and extensors, and the like, but to several others; and particularly to those of the eyes, the lips, the jaws, the tongue, the neck, the abdomen, the arm, the carpus, &c. These we are carefully to attend to, and explain to ourselves, by what particular muscles, acting distinctly, they are performed; otherwise we shall never be able to understand the various and wonderful motions of the parts. Winslow, in his excellent observations on the actions of the muscles, published in the Memoirs of the Paris Academy, observes, among other curious things, that a great many of the motions of the muscular parts are not owing to the supposed contraction, but to the relaxation of the muscles on the opposite side.

Insertion and force of the MUSCLES. The all-wise author of nature has furnished animals with limbs, moveable about the joints by means of muscular cords, inserted near the joints or center of motion; the great wisdom of which contrivance will appear, from supposing the insertion to be at E (plate CLXXXV. fig. 2.) near the wrist B, the muscle DE being either loose and separate from the bones DAB, or bound down to it by some ligament or fascia R; in either of which cases the bone AB cannot be turned up quite to the situation AH, unless the muscle DE be contracted or shortened to DM, which would not only be troublesome but even impossible. It would be trouble-

troublesome because the breadth and thickness of the arm would be vastly increased, so as to become as big as the belly of an animal. On the other hand, the structure of a muscle being such that it cannot be contracted but a little, seldom above two or three fingers breadth; such an insertion as that at E, which requires a contraction of above a foot and a half, would be altogether impossible. Therefore, in fact, we find the muscles inserted near the center of motion, as at I, *ibid.* fig. 3.

In order to calculate the force of any muscle, we are to consider the bones as levers; and then the power or force of the muscle will be always to the resistance or weight it is capable of raising, as the greater distance of the weight from the center of motion is to the lesser distance of the power. Hence, it being found by experiments, that a robust young man is able to suspend a weight R (*ibid.* fig. 3.) equal to twenty-eight pounds, when the arm is extended in a supine and horizontal situation, we have this proportion, *viz.* the force of the muscle ID is to the weight R, = 28 lb. as the distance BC is to the distance IC. But it is found, that BC, the length of the cubit and hand, is more than twenty times greater than IC, the distance of the muscle from the center of motion. Therefore the force of the muscle ID, must be more than twenty times greater than the weight R, or more than $28 \times 20 = 560$ lb.

Again, to find the force which the biceps and brachii muscles exert, when the humerus EA (*ibid.* fig. 4.) is perpendicular to the horizon, we are first to consider what weight a man is capable of sustaining in this posture, *viz.* R = 35 lb. and next the quantity of the distances CB, CI, which in this case are as 16 to 1. Therefore the force of these muscles is to the weight R = 35 lb. as the distance C = 16 is to the distance of IC = 1; or the force is equal to 560, as before.

But what appears most wonderful, is the force of the muscles that move the lower jaw; which, when taken altogether, do not in a man exceed the weight of 1 lb. and yet exert a force equal to 534 lb. and in massive dogs, wolves, bears, lions, &c. their force is vastly superior, so as to break large bones, as they practise daily in their feeding.

The motions of the far greater part of

the muscles are voluntary, or dependent on our will; those of a few others, involuntary. The former are called animal, the other natural motions. Finally, the motions of some of the muscles are of a mixed kind, partly animal and partly natural. Those muscles which perform the voluntary motions receive nerves from the brain or spinal marrow; those which perform their motions involuntarily, have their nerves from the cerebellum; and those whose motion is partly voluntary and partly involuntary, have theirs in part from the brain, and in part from the cerebellum. And as a muscle can no longer act when its nerve is either cut asunder or tied up, so the same absolute dependence it has on its artery; for from the experiments of Steno and others on living animals, it appears, that on cutting or tying up the artery, the muscle in the same manner loses its whole power of action, as if the nerve had been cut or tied up.

Names, number, and distinction of the MUSCLES. The muscles generally receive their names from their fixed and moveable points, conjointly; sometimes from the fixed point only; and sometimes, only from the moveable point: some of them also are denominated from their uses; and some from their figure, or resemblance to other things: and, finally, some from their size, situation, or other qualities, as will appear in our description of each of them under its proper article.

As to the number of the muscles in the human body, authors are strangely disagreed about it: however, they are certainly, says Heister, more than five hundred; the principal ones whereof are represented in two plates; those conspicuous in the fore-part of the human body, being expressed in plate CLXXXIV. fig. 1. where 1. 1. are the frontal muscles; 2. 2. the orbiculares palpebrarum; 3. the attollens auriculam; 4. the temporalis; 5. the masseter; 6. represents the muscle called, by Lancisi, constrictor, or depressor pinnæ narium; 7. the dilatator alæ nasi; 8. the zygomaticus; 9. the place of the elevator labiorum, or elevator labiorum communis, called, by Lancisi, gracilis; 10. the elevator labii superioris proprius; 11. 11. the constrictor, or sphincter labiorum, or orbicularis labiorum; by some called osculatorius; 12. the buccinator; 13. 13. the muscoli mastoidei; 14. 14. the sterno-hyoidei;



Fig. 1. MUSCLES
of the Back part
of the Human Body

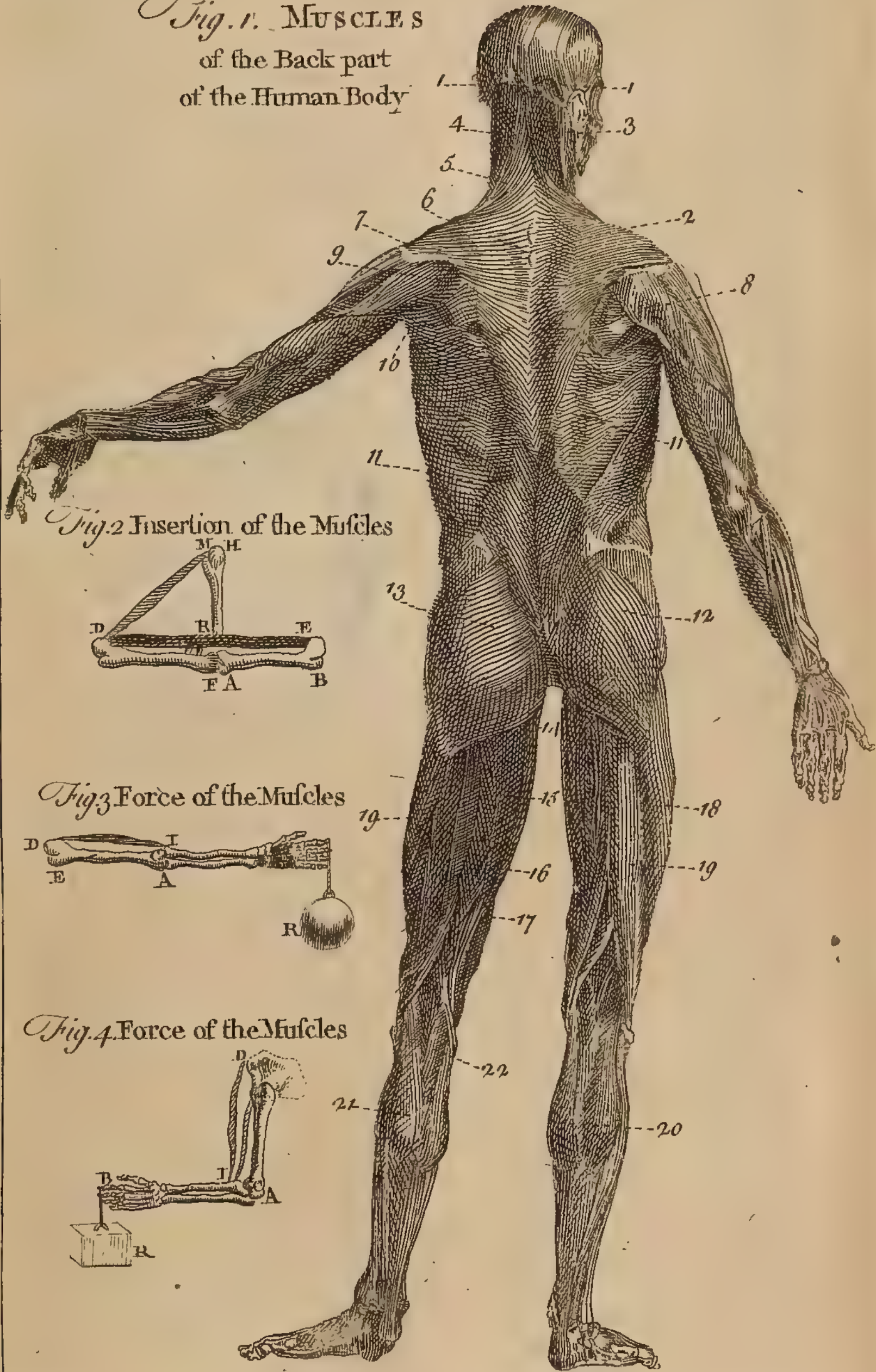


Fig. 2 Insertion of the Muscles

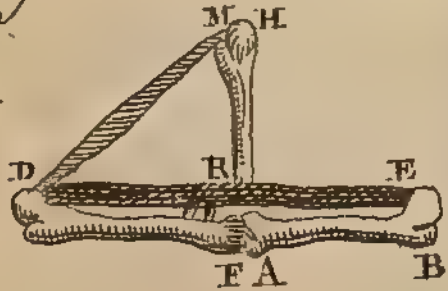


Fig. 3 Force of the Muscles

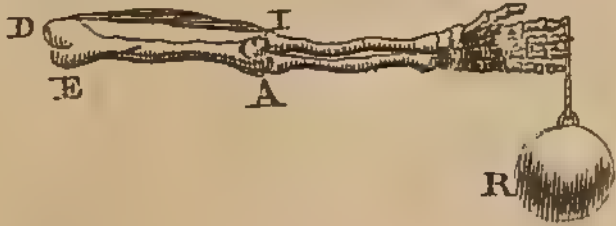
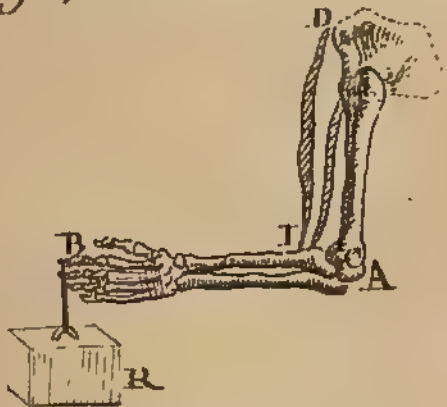


Fig. 4 Force of the Muscles



hyoidei; 15. 15. those parts of these muscles which arise from the clavicle; 16. 16. the coracohyoidei; 17. the scaleni; 18. represents part of the cucullaris on the right side; 18. on the left side, is the levator, or elevator scapulæ, otherwise called musculus patientiæ; 19. 19. the place where the fibres of the pectoralis unite, in some measure, with those of the deltoides; 20. 20. the deltoides; 21. the place in the carpus, where the palmaris longus passes through a ring in the annular ligament; 22. a remarkable union of the tendons of the extensors of the three last fingers; 23. 23. the productions of the peritonæum, which, perforating the muscles of the abdomen at the rings, descend to the scrotum; 24. 24. the place where the three tendons of the sartorius, gracilis, and seminevrosus are inserted into the anterior and internal part of the tibia, just under the knee; 25. 25. the tendons of the extensors of the toes, which are secured by a ligament at the ankle, as appears on both sides; but on the right side, internally, another ligament is represented, which fixes the tendons of the extensor longus digitorum, the tibialis posticus, and the flexor pollicis; 26. 26. the musculus pectoralis; 27. the triceps extensor cubiti on the right side; 28 and 30. the biceps on the left side, according to Lancisi's explication; 29. part of the triceps extensor on the left side; 30. the biceps on the right side; 31. the brachialis internus; 32. the anconæus; 33. the pronator rotundus; 34. 34. the supinator longus; 35. 35. the radius externus, according to Lancisi; 36. the extensor carpi ulnaris; 37. 37. the cubitæus internus, according to Lancisi; 38. the radius internus, according to Lancisi; 39. the palmaris with its tendinous expansion; 40. 40. the tendons of the muscles of the thumb; 41. the tendon of the adductor pollicis; 42. the extensor magnus digitorum; 43. ligamentum carpi; 44. 44. the tendons of the ilioci interni; 45. the pectinæus; 46. one of the heads of the triceps; 47. 47. the rectus femoris on each side; 48. 48. the vastus externus on each side; 49. 49. the vastus internus on each side; 50. the gracilis; 51. the seminevrosus; 52. the sartorius on each side; 53. a part of the origin of the vastus externus; 54. 54. the membranous; 55. the tibialis anticus; 56. the gemeli; 57. 57. the solæi; 58. the tendo-achilis; 59. according to

Lancisi, is the extensor digitorum longus; 60. 60. the tendons of the extensors of the toes; 61. the tendons of the extensor longus, tibialis posticus, and flexor pollicis; A. A. portions of the latissimus dorsi on each side; B. B. the indentations of the serratus major anticus; C. C. the sternum.

Plate CLXXXV. fig. 1. represents the muscles of the back-part of the human body; where 1. 1. express the two muscles upon the occiput, called, by Eustachius, quadrati; 2. the musculus cucullaris; 3. the splenius; 4. the musculus mastoideus; 5. the musculus patientiæ, or levator scapulæ proprius; 6. the rhomboides; 7. the articulation of the clavicle with the scapula on the right side; 8. the deltoides; 9. the teres minor; 10. the teres major; 11. 11. the latissimus dorsi on each side; 12. the glutæus major; 13. the glutæus medius; 14. the musculus pyriformis; 15. the quadratus femoris; 16. the biceps femoris; 17. the semimembranosus; 18. the membranous, according to Lancisi; 19. 19. the vasti externi; 20. the gastrocnemii; 21. the soleus; 22. the plantaris.

MUSCLE, *mytilus*, in natural history, a shell composed of two valves, of an oblong figure, and shutting close all the way; the valves are both convex, and of a similar shape: and the animal inhabiting it is called a tethys. See the article TETHYS.

Of the numerous species of muscles, some are of a conic figure; others oblong, and equal at both extremities, called by many tellinæ; some are smooth on the surface, others rough; and, finally, some are much deeper than others.

To this genus belongs the pinna marina, or ovato-conic, great striated, and rugose sea-muscle: it is one of the largest of the bivalve shells, being frequently two feet long, and near one broad. The other species of muscles are numerous, and are called, by authors, pinnæ marinæ, muscoli, and tellinæ.

MUSCOVY-GLASS, in natural history, the white shining specularis with large and broad leaves, otherwise called isinglass. See the article SPECULARIS.

MUSCULAR, or MUSCULOUS, in anatomy, something relating to, or partaking of the nature of a muscle. See the article MUSCLE.

From the subclavians, arise the muscular arteries of the neck, which are uncertain both

both in their number and situation, and are distributed through the muscles of the neck.

There are also muscular veins of the neck, which are either superior or inferior, arising also from the subclavian veins.

MUSEUM, a name which originally signified a part of the palace of Alexandria, which took up at least one fourth of that city. This quarter was called the Museum, from its being set apart for the muses and the study of the sciences. Here were lodged and entertained the men of learning, who were divided into many companies or colleges, according to the sciences of which they were the professors; and to each of these houses or colleges was allotted a handsome revenue. The foundation of this establishment is attributed to Ptolemy Philadelphus, who here placed his library. Hence the word museum is now applied to any place set apart as a repository for things that have an immediate relation to the arts.

The Museum at Oxford, called the ashmolean Museum, is a noble pile of building, erected at the expence of the university, at the west end of the theatre, at which side it has a magnificent portal, sustained by pillars of the corinthian order. The front, which is to the street, extends about sixty feet, where there is this inscription over the entrance, in gilt characters, *Museum Ashmoleanum, schola naturalis historiae, officina chymica.*

It was begun in 1679, and finished in 1683, when a valuable collection of curiosities was presented to the university by Elias Ashmole, esq. which were the same day repositied there. And several accessions have been since made to the museum; among which are hieroglyphics and other egyptian antiquities, an entire mummy, roman antiquities, altars, medals, lamps, &c. and a variety of natural curiosities.

The british Museum in London is a large, beautiful and magnificent building, and the noblest cabinet of curiosities in the world. This edifice was erected in 1677, and was called Montague-house, from having been the town-residence of the dukes of Montague. In the year 1753, the british parliament having passed an act for purchasing the Museum of the late Sir Hans Sloane, and the collection of manuscripts of the late lord Oxford, called the Harleian Library, for the use of the public; 26 trustees were appointed

and incorporated, to provide a repository for these and some other collections, which repository was to be called the British Museum. These trustees elected fifteen other trustees, and having bought Montague-house, fitted it up for the reception of these collections; they also appointed officers to superintend the Museum, and having ordained certain statutes with respect to viewing the collection contained in it, the public were admitted to view it in 1757.

MUSES, certain fabulous divinities amongst the pagans, supposed to preside over the arts and sciences: for this reason it is usual for the poets, at the beginning of a poem, to invoke these goddesses to their aid. Some reckon the muses to be no more than three, viz. Mneme, Aoele, and Melete; that is, memory, singing, and meditation; but the most antient authors, and particularly Homer and Hesiod, reckon nine; viz. Clio, which means glory; Euterpe, pleasing; Thalia, flourishing; Melpomene, attracting; Terpsichore, rejoicing the heart; Erato, the amiable; Polyhymnia, a multitude of songs; Urania, the heavenly; and Calliope, sweetness of voice. To Clio, they attributed the invention of history; to Melpomene, tragedy; to Thalia, comedy; to Euterpe, the use of the flute; to Terpsichore, the harp; and to Erato, the lyre and lute; to Calliope, heroic verse; to Urania, astrology; and to Polyhymnia, rhetoric.

The muses are painted young, handsome, and modest; agreeably dressed, and crowned with flowers. Their business was to celebrate the victories of the gods, and to inspire and assist the poets: hence the custom of invoking their aid at the beginning of a poem. It must not, however, be imagined, that the antient poets themselves ever considered the deities thus invoked, as divine persons from whom they expected any real help. Their addresses to the muses are mere allegories, and manners of expressing themselves poetically, as when they make gods of sleep, of fame, of virtue; and other natural and moral things; under the name of muse they prayed for the genius of poetry, and all the talents necessary for a happy execution of what they had undertaken.

MUSHROOM, *fungus*, in botany, a genus of imperfect plants, composed of a pedicle, crowned with a broad head, convex

convex and smooth at the top ; and hollow, foliated, lamellated, or fistulous on the under side.

Mushrooms are by many supposed to be produced from the putrefaction of the dung in which they are found ; but notwithstanding this notion is pretty generally received among the unthinking part of mankind, yet, by the curious naturalists, they are esteemed real plants ; for they have a regular root, a stalk consisting of several arrangements of fibres, the interstices of which are filled up with a parenchymatous substance, leading from the root to the head or umbel, the under-side of which is full of lamellæ or chives, every one of which is a regular pod or seed-vessel. If these lamellæ are examined in their several states, the seeds in them may be easily discovered, and are always found to be of a size and degree of maturity proportioned to the state of the plant : they have each of them also a filiquaceous aperture lengthwise, the seeds lying in rows ready to fall through it. The plant is easily and regularly propagated through these, and may not only be raised from seed, but like many other plants, may be propagated by roots ; the several filaments at the root producing tubercles, in the manner of the potatoe ; from each of which there will arise new roots, and a new plant. Hence, like other vegetables, they are annually propagated by the gardeners near London for sale. We shall therefore describe the method of cultivating them ; but as there are several unwholesome sorts, we shall first give a short description of the true eatable kinds. These at first appear of a roundish form, like a button, the upper part of which, as also the stalk, is very white ; but being opened, the under part is of a livid flesh-colour ; but the fleshy part, when broken, is very white : when these are suffered to remain undisturbed they will grow to a large size, and explicate themselves almost to a flatness, and the red part underneath will change to a dark colour.

Mr. Miller directs the following method of cultivating them. If you have no beds of your own that produce them, you should look abroad in rich pastures, during the months of August and September, till you find them ; and then opening the ground about their roots, you will often find the earth full of small white knobs, which are the off-sets from

the mushrooms : these should be carefully gathered ; and preserved dry with the earth about them. The mushroom-beds should be made of dung in which there is good store of litter. These beds should be made on dry ground, and the dung being laid upon the surface about a foot thick, two feet and a half broad, and of a length in proportion to the quantity of mushrooms desired, it should be covered about four inches deep with strong earth ; upon this lay more dung, about ten inches thick ; then another layer of earth ; still drawing in the sides of the bed, so as to form it like the ridge of an house, which may be done by three layers of dung and as many of earth. When the bed is finished it should be covered with litter, to keep out the wet and prevent its drying ; in this situation it may remain eight or ten days, by which time it will be of a proper degree of warmth ; the litter should then be taken off, the sides of the bed smoothed, and a covering of light rich earth should be laid over the bed ; upon this the small roots or off-sets of the mushrooms should be put, placing them two or three inches asunder ; then gently cover them about half an inch thick with the same light earth ; and again put on the covering of litter. The great skill in managing these beds, is that of keeping them in a proper temperature of moisture. By this means mushrooms may be produced all the year ; and when the beds are destroyed, the surface which contains the dust and roots of the mushrooms, should be laid by in a dry place for a fresh supply, till the proper time of using it.

MUSIC, is one of the seven sciences, commonly called liberal, and comprehended also among the mathematical, as having for its object discrete quantity or number, but not considering it in the abstract like arithmetic, but in relation to time and sound, in order to make a delightful harmony : or, it is the art of disposing and conducting sounds considered as acute and grave ; and proportioning them among themselves, and separating them by just intervals pleasing to the sense.

Mr. Malcolm defines it a science that teaches how sound, under certain measures of time and tune, may be produced ; and so ordered and disposed, as either in consonance (*i. e.* joint sounding) or succession, or both, they may raise agreeable sensations.

From this definition, the science naturally divides into two general parts, *viz.* speculative and practical.

The first is the knowledge of the materia musica, or how to produce sounds in such relations of time and tune as shall be agreeable in consonance or succession, or both. By which we do not mean the actual production of these sounds by an instrument or voice, but the knowledge of the various relations of tune and time, which are the principles out of which the pleasure sought is derived.

The second is how the principles are to be applied, or how sounds in the relation they bear to music (as those are determined in the first part) may be ordered, and variously put together in succession and consonance, so as to answer the end. And this is what we call the art of composition, which is properly the practical part of music.

Some add a third branch, *viz.* the knowledge of instruments; but as this depends altogether on the first, and is only the application and expression of it, it cannot regularly come under the definition, and consequently is no part or division of the science.

The first branch, which is the contemplative part, divides itself into two; the knowledge of the relations and measures of time, and the doctrine of time itself.

The former is properly what the antients called harmonics, or the doctrine or harmony in sounds, as containing an explication of the grounds, with the various measures and degrees of the agreement of sounds in respect of their tune.

The latter part is what they called rhythmica, because it treats of the numbers of sounds or notes, with respect to time; containing an explication of the measures of long and short, quick and slow, in the succession of sounds.

The second part, which is the practical part, as naturally divides itself into two, answering to the parts of the first.

That which answers to harmonics, the antients called melopœia, because it contains the rules of making songs, with respect to tune and harmony of sounds. Mr. Malcolm says, we have no reason to think the antients had any such thing as composition in parts. That which answers to rhythmica, they called rhythmopœia; containing rules for the application of numbers and tune.

We find a strange diversity in antient

writers, as to the nature, office, extent, division, &c. of music.

The name is supposed originally formed of *musa*, muse; the muses being supposed to be the inventors thereof; Kercher, however, will have it take its name from an egyptian word, as supposing its restoration after the flood to have begun there, by reason of the reeds on the banks of the river Nile. Hesychius tells us, the Athenians gave the name of music to every art.

What in the proper and limited sense of the word is called music, has for its object motion, considered as under certain regular measures and proportions, by which it affects the senses in an agreeable manner. Now as motion belongs to bodies, and as sound is the effect of motion, and cannot be without it, but all motion does not produce sound; hence this last branch of music became farther subdivided.

Where motion is without sound, or as it is only the object of sight, it was either called musica orchestria or saltatoria, which contains rules for the regular motions of the body in dancing; or musica hypocritica, which respects the motions and gestures of the pantomimes.

When the motion is only perceived by the ear, that is, when sound is the object of music, there were three species, *viz.* harmonics, which consider the difference and proportions, with respect to acute and grave; rhythmica, which respects the proportions of sounds as to time, or the swiftness or slowness of their succession; and metrica, which belongs properly to poets, and respects the art of making verses: these are the principles which Alypius allows of.

Aristides, Quintilianus, Bacchius, and other antient writers, define music the knowledge of singing, and things belonging thereto; which they call the motions of the voice and body; as if singing itself consisted only in the different tone of the voice. The same authors, considering music in the largest sense of the word, divide it into contemplative and active; the first, say they, is either natural or artificial. The natural is either arithmetical, because it considers the proportions of numbers; or physical, which examines the order of the things of nature.

The artificial they divide as above, into harmonics, rhythmica, and metrica. The

The active, which is the application of the artificial, is either enunciative, as in oratory; organical, or instrumental performance; odical, for the voice and singing of psalms; hypocritical, in the motions of the pantomimes; to which some add hydraulic, though in reality no more than a species of organical, in which water is used for the producing and modifying of sounds. The musical faculties, as they call them, are melopoeia, which gives rules for the tones of the voice or instrument, and rhythmopoeia, for motions; as also poësis, for making verses.

Music appears to have been one of the most antient arts, and of all others vocal music must undoubtedly have been the first kind; for man had not only the various tones of his own voice to make his observations on, before any other art or instrument was found out, but had the various strains of birds to give him occasion to improve his own voice, and the modulations of sounds it was capable of. Of the many antient writers who agree in this conjecture, we shall only mention Lucretius, who says,

*At liquidas avium voces imitauer ore,
Ante fuit multo quam levia carmina
cantu,
Concelebrare homines possent aurisque
juvare.*

The first invention of wind-instruments he ascribes to the observation of the winds blowing in hollow reeds.

We might here add another testimony of the antiquity of this art from the Holy Bible, which says, that Jubal the sixth from Adam was the father of such as handle the harp and organ.

As for the other kinds of instruments, there were so many occasions for cords and strings, that men could not be long in observing their various sounds, which might give rise to stringed instruments. And for pulsatile instruments, as drums, and cymbals, they might arise from the observation of the hollow noise of concave bodies.

Plutarch, in one place, ascribes the invention of music to the god Apollo, and in another to Amphion, son of Jupiter and Antiope; this last, however, is pretty generally allowed to be the first who brought music into Greece, and to have been the first inventor of the lyra. The time he lived is not agreed upon.

To him succeeded Chiron, the demi-god; Demodocus, Hermes Trismegistus,

Olympus, Orpheus, whom some make the first introducer of music into Greece, and the inventor of the lyra; Phenicius Terpander, who was cotemporary with Lycurgus, and set his laws to music, to whom some attribute the first institution of musical modes, and of the lyre; Thales and Thamyras, who is said to have been the first inventor of music without singing. These were eminent musicians before Homer's time. Others of later date were Lasus Hermionensis, Melanippides, Philoxenus, Timotheus, Phrynnis, Epigonus, Lysander, Simmicus, and Diodorus, who were all considerable improvers of music. Lasus is said to have been the first author who wrote on music; he lived in the time of Darius Hystaspes. Epigonus invented an instrument with forty strings, called epigonium: Simmicus also invented one with thirty-five strings, called simmicium: Diodorus improved the tibia, by adding new holes, and Timotheus the lyre, by adding a new string; for which he was fined by the Lacedemonians.

As the accounts we have of the inventors of musical instruments among the antients, are very obscure, so also are the accounts what those instruments were; we scarce know any thing of them besides their names.

The general division of instruments, is into the stringed instruments, wind-instruments, and those of the pulsatile kind. Of stringed instruments, we hear of the lyra or cythara, psaltery, trigon, sambucus, magade, barbiton, pectis, testudo, epigonium, simmicium, and pandoron, which were all struck with the fingers or plectra.

Of wind-instruments, we hear of the tibia, fistula, hydraulic and other organs, tubæ, cornua, and lituus.

Of the pulsatile instruments, we hear of the tympanum, cymbalum, crepitaculum, tintinabulum, crotalum and systrium.

Music has been in the highest esteem in all ages, and among all people; nor could authors express their opinions of it strongly enough, but by inculcating that it was in heaven, and was one of the principal entertainments of the gods, and the souls of the blessed.

The effects ascribed to it by the antients, are almost miraculous; by means hereof diseases have been cured, unchastity corrected, seditions quelled, passions raised and calmed, and even madness occasioned. Athenæus assures us, that antiently all

laws divine and civil, exhortations to virtue, the knowledge of divine and human things, lives and actions of illustrious persons, were writ in verse, and publicly sung by a chorus to the sound of instruments; which was found the most effectual means to impress morality, and a right sense of duty on the mind.

Dr. Wallis has endeavoured to account for the surprising effects ascribed to the antient music, and charges them principally on the novelty of the art, and the hyperboles of the antient writers; nor does he doubt but the modern music, *cæteris paribus*, would produce effects as considerable as that of the antients: the truth is, we can match most of the antient stories in this kind, in the modern histories; if Timotheus could excite Alexander's fury with the phrygian sound, and sooth him into indolence with the lydian, a more modern musician is said to have driven Eric king of Denmark into such a rage, as to kill his best servants. Dr. Newenteit tells us of an Italian, who by varying his music from brisk to solemn, and so *vice versa*, could move the soul so as to cause distraction and madness. And Dr. South has founded his poem, called *Musica Incantans*, on an instance he knew of the same thing. Derham, in his *Physico Theology*, makes mention of many other things equally surprising with the instances above recited.

There is a great dispute among the learned, whether the antients or moderns best understood and practised music; some maintaining that the antient art of music, by which such wonderful effects were performed, is quite lost; and others, that the true science of harmony is now arrived to much greater perfection, than was known or practised among the antients.

The antient musical notes were very mysterious and perplexed. Boëtius and Gregory the great, first put them into a more easy and obvious method. It was in the year 1204, that Guido Aretine, a benedictine fryar of Auretium in Tuscany, first introduced the use of the staff with five lines, on which with the spaces he marked his notes, by setting a point up and down upon them, to denote the rise and fall of the voice; tho' Kercher mentions this artifice to have been in use long before Guido's time. Another contrivance of Guido's was to apply

the six musical syllables, *ut, re, mi, fa, sol, la*, which he took out of St. John the baptist's hymn. Besides his notes of music, by which, according to Kercher, he distinguished the tones or modes, and the seats of the semitones, he also invented the scale, and several musical instruments, called poly-plectra, as spinnets and harpsicords.

The next considerable improvement was in the year 1330, when Jean De Muris, doctor of Paris, invented the different figures of notes, which express the times or length of every note, at least their relative proportions to one another, now called longs, breves, semi-breves, crotchets, quavers, semiquavers, and demi-semiquavers, which see under their respective articles.

Guido Aretine is also said to be the first who invented and brought symphony or concert into music; but what progress he made, and what were his compositions, we do not know. In short, we may venture to affirm from the whole of what we find wrote on this subject, that music did not begin to arrive at any tolerable perfection, till towards the end of the last century, when the great Purcel and Corelli obliged the world with their most agreeable and harmonical compositions; then it was that music began to advance a-pace, and receive various improvements from many other ingenious composers and performers of several european nations, especially the Italians and English, and now seems brought near its utmost perfection; since all the agreeable combinations of the various continuance, rising, falling, and mixtures of tones, must be contained within certain limits, whose number may not be so great as is generally imagined; and because of the great number of persons who have for more than thirty years last past, applied themselves to this art: among whom the excellent Mr. Handel himself, deservedly named the prince of musicians, both for his composition and performance upon the organ and harpsicord, has abundantly and wonderfully performed his part.

MUSK, a dry, light, and friable substance, of a dark blackish colour, tinged with purple; it is a kind of perfume of a very strong scent, and only agreeable when in a very small quantity, or moderated by the mixture of some other perfume. It is found in a kind of bag or tumour which grows under the belly of a wild
beast.

beast called moschus. See MOSCHUS. Musk is brought to us sewed up in a kind of bladders or cases of skin of the bigness of a pigeon's egg, or larger, each containing from two or three drams to an ounce of musk. These are covered with a brownish hair, and are the real capsules in which the musk is lodged while on the animal. That which is unadulterated appears in masses, of loose and friable granules, which are soft to the touch, and easily crumble between the fingers, feeling somewhat smooth and unctuous.

Musk taken inwardly produces ease from pain, quiet sleep, and a copious diaphoresis: hence it has been found of great use in spasmodic disorders, petechial, malignant, putrid fevers, the jail-distemper, hiccoughs, &c. and Dr. Wall observes, that it has been found useful in spasmodic disorders, given by way of clyster. The operation of musk in some respects resembles that of opium; but it does not leave behind it any stupor or languidness, which the latter often does. Musk likewise seems likely to answer in those low cases where sleep is much wanted, and opiates are improper. It is said to be best given in a bolus, in which form those who are most averse to perfumes, may take it without inconvenience. Fifteen grains or more are now given in a dose with great success.

MUSK-HOG, *Tajacu*. See TAJACU.

MUSK-ANIMAL, *Moschus*. See the article MOSCHUS.

MUSK-SEED, in botany, the English name of that species of hibiscus, called by botanists the abelmosch. See HIBISCUS.

MUSK-JULEP. See the article JULEP.

MUSKET, a fire-arm borne on the shoulder, and used in war. The length of a musket is fixed at three feet eight inches from the muzzle to the pan, and it carries a ball of sixteen to the pound.

In fortification, the length of the line of defence is limited by the ordinary distance of a musket-shot, which is about 120 fathoms; and the length of almost all military architecture is regulated by this rule.

Muskets, besides the ordinary duty on iron, pay on importation 1s. 11 $\frac{1}{10}$ d. each; and draw back, on exportation, 1s. 8 $\frac{2}{10}$ d. but they are not to be imported without licence.

MUSKET-BASKETS, in fortification. See the article BASKETS of earth.

MUSKETOON, a kind of short thick musket, whose bore is the thirty-eighth part of its length: it carries five ounces of iron, or seven and a half of lead, with an equal quantity of powder. This is the shortest sort of blunderbusses. See the article BLUNDERBUSS.

MUSLIN, a fine thin sort of cotton-cloth, which bears a downy knap on its surface. There are several sorts of muslins brought from the East-Indies, and more particularly from Bengal; such as doreas, betelles, mulmuls, tanjeebs, &c.

Muslins, on their importation, pay a duty of 2s. 10 $\frac{2}{10}$ d. the piece, which is drawn back on exportation; and besides this, a duty of 15l. per cent. to be computed according to the gross price at which they are publicly sold by auction: but if they are exported, all drawn back is for 20s. value.

MUSSÆNDA, in botany, a genus of the pentandria monogynia class of plants, the corolla of which consists of a funnel-shaped petal; the fruit is oval, oblong, succulent, and coronated; and the seeds are numerous, and arranged into four series.

MUSSELBOROUGH, a port-town of Scotland, in the shire of Lothian, six miles east of Edinburgh.

MUSTARD, *sinapi*, in botany. See the article SINAPI.

MUSTELA, in zoology, a genus of quadrupeds of the order of the feræ, the upper foreteeth of which are straight, distinct, and acute; the foreteeth of the lower jaw are obtuse and clustered, two of them stand inward; the feet are made for climbing.

This genus comprehends the gulo, the martin, the pole-cat, the weasel, the ferret, the ermin, the sable, the genet, the tabbied mungo, and the brown mungo. See the article GULO, &c.

MUSTELA, or the FOSSIL MUSTELA, in ichthyology, is also the name of the blue cobitis, with five longitudinal black lines on each side. See the article COBITIS.

This is a species very singular in its manner of living, as well as in its figure; it is five inches long, and somewhat more than half an inch in diameter; the head is short, broad, and obtuse; the belly is smooth, and of a bluish colour, with ten longitudinal lines running down it, five on each side of the back; about the mouth is placed a number of whitish slender

slender cirri or beards; the pectoral fins have each eleven rays, the ventral ones five, the dorsal and the pinna ani seven. Where the shores are sandy, it will work its way under the sand to a great distance from the water, and is there dug up.

MUSTAGEN, a port-town of Barbary, in the kingdom of Algiers, 140 miles west of the city of Algiers.

MUTE, *dumb*, in a general sense, signifies a person that cannot speak, or has not the use of speech.

MUTE, in law, a person that stands dumb or speechless, when he ought to answer, or to plead. A prisoner, by our law, is said to stand mute several ways, *viz.*
 1. When he does not speak at all, in which case it shall be inquired whether he stands mute out of obstinacy, or by the act of God. 2. When the prisoner does not plead directly, or will not put himself on the inquest to be tried; or where he feigns himself mad, and refuses to answer upon his trial. 3. A prisoner shall be taken as one that stands mute, when on his trial he peremptorily challenges above the number of jurors allowed by law. In the crime of high treason, if the prisoner stands mute, he shall forfeit lands and goods in the same manner as if he had been attainted. Also in felony and petit treason, a person that stands mute shall forfeit his lands and goods as on other attainders, though whenever a person standing mute is adjudged to his penance for felony, it is held he thereby prevents the attainder which otherwise might be incurred, and forfeits only his chattels.

MUTE, in grammar, a letter which yields no sound without the addition of a vowel. The simple consonants are ordinarily distinguished into mutes and liquids, or semi-vowels. See the articles **CONSONANT**, **LIQUID**, &c.

The mutes in the greek alphabet are nine, three of which, *viz.* π, ς, τ, are termed *tenuēs*; three, β, γ, δ, termed *mediæ*; and three, φ, χ, θ, termed *aspirates*. See the article **ASPIRATE**, &c.

The mutes of the latin alphabet are also nine, *viz.* B, C, D, G, I, K, P, Q, T.

MUTILATION, the retrenching or cutting away any member of the body.

This word is also extended to statues and buildings, where any part is wanting, or the projecture of any member, as a cornice or an impost is broken off. It is sometimes also used, in a more im-

mediate manner, for castration. See the article **CASTRATION**.

MUTUAL, a relative term, denoting something that is reciprocal between two or more persons: thus we say, mutual assistance, mutual promise, mutual love, &c.

MUTULE, in architecture, a kind of square modillion set under the cornice of the doric order. See **DORIC**.

The only difference between the mutule and modillion consists in this, that the former is used in speaking of the doric order, and the latter in the corinthian. See **CORINTHIAN** and **MODILLION**.

MUTUUM, in the civil law, denotes a loan simply so called; or a contract introduced by the law of nations, whereby a thing consisting in weight, as bullion; in number, as money; or in measure, as corn, timber, wine, &c. is given to another upon condition that he shall return another thing of the same quantity, nature, and value, on demand. This therefore is a contract without reward, so that where use or interest arises, there must be some particular article in the contract whereon it is founded.

MUXARA, a port-town of Spain, in the province of Granada, situated on the Mediterranean, fifty miles south-west of Carthagenæ.

MUYDEN, a town of Holland, situated on the south coast of the Zuider sea, seven miles east of Amsterdam.

MUZZLE of a gun or mortar, the extremity at which the powder and ball is put in; and hence, the muzzle-ring is the metalline circle, or moulding, that surrounds the mouth of the piece. See the article **GUN**.

MYAGRUM, in botany, a genus of the tetradynamia filiculosa class of plants, the corolla whereof consists of four plane, roundish, obtuse petals, disposed crosswise, and narrower than the ungues. The fruit is a bivalve turbinato-cordated small pod, lightly compressed and rigid, with the apex ending in a conical rigid style; the seeds are roundish.

MYCONE, one of the islands of the Archipelago, about twenty-five miles in circumference, situated in east long. 25° 6', north lat. 37°.

MYLOGLOSSUM, in anatomy, is, according to Heister, no more than a part of the mylohyoides, though other anatomists make it a distinct pair of muscles, thus called because it arises about the backside of the molares, and is inserted into

into the ligament of the tongue, helping to pull it upwards; being the same with what Cowper calls styloglossum. See the next article.

MYLOHYOIDÆUS, in anatomy, one of the five pair of muscles belonging to the os hyoides. The mylohyoidæus arises with a large base from the bottom of the lower jaw, near the chin, and terminates at the base of the os hyoides. See the article **HYOIDES**.

Besides the common use ascribed to this muscle, which is to move the hyoides, the tongue, and the larynx, both upwards, inwards, and sideways, its series of transverse fibres have a farther use, when it is at rest; and that is to compress the glands under the tongue, and by this means promote the discharge of the saliva into the mouth from the lower salival ducts: whence it is we use this muscle, when we want saliva in the mouth.

MYLON, in surgery, a large kind of staphyloma. See the article **STAPHYLOMA**.

MYOLOGY, μυολογια, that part of anatomy which treats of the muscles of the human body. See the article **MUSCLE**.

MYOMANCY, a kind of divination by means of mice. See **DIVINATION**.

MYOPIA, or **MYOPIAS**, short-sightedness, a species of vision, wherein objects are seen distinctly only at small distances; which is incident to persons who have the cornea and crystalline, or either of them, too convex.

From this configuration of the eye it is plain, that the distinct picture of objects at an ordinary distance will fall before the retina; whence the vision must be confused and indistinct. In order therefore to see distinctly, they are obliged to bring the objects very nigh to the eyes; by which means the rays being more diverging, are made to converge and meet at the retina; where a distinct picture being formed, the object will be seen distinctly.

They that are short-sighted never look attentively at those who speak to them, as being unable to observe the motion of their eyes, which contributes greatly to explain and enforce their words; and therefore, they are only attentive to the discourse. Short-sighted persons need less light than others, to see distinctly; whence they can read the smallest print, when others are not able to distinguish one letter from another.

Myopes, or short-sighted persons, have

their sight mended by a concave lens, of a due degree of concavity: for the refraction of the rays of light being in such persons too strong, in proportion to the distance of the retina from the crystalline; this refraction will be diminished by the interposition of such a glass, whereby the objects will be seen distinctly: but as such glasses represent objects under a less angle, they must appear less than to the naked eye.

Short-sighted persons usually become less so, as they advance in years; and that because the humours of the eye wasting, the cornea shrinks and becomes less convex, and the crystalline becomes flatter than before; by which means objects are seen more distinctly, and at greater distances, than when the refraction was stronger in the more plump and convex eyes. See the article **VISION**.

MYOSOTIS, **MOUSE-SAR**, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous flower, semiquinifid at the limb: the seeds are four, which are contained in the bottom of the cup.

MYOSURUS, **MOUSE-TAIL**, in botany, a genus of the pentandria-polygynia class of plants, the flower of which consists of five very small petals; and its numerous seeds are disposed in an imbricated order upon a receptacle.

MYRIAD, a term sometimes used to denote ten thousand.

MYRICA, in botany, a genus of the dioecia-tetrandria class of plants, without any flower petals: the cup is a squama of a lunated figure; and the fruit is a berry, containing only a single seed.

MYRIOPHYLLUM, **SMALL WATER-MILFOIL**, in botany, a genus of the monoecia-polyandria class of plants, without any flower petals; and the fruit is composed of four naked seeds.

MYRISTICA, the **NUTMEG-TREE**, a genus of trees, the characters of which are not fully ascertained: it is said to have no flower petals; and its fruit is a drupe, of a roundish figure, containing a single seed, lightly sulcated. See **NUTMEG**.

MYRMECIA, or **FORMICA**, a painful kind of wart, with a broad base, and deeply rooted; growing on the palms of the hands, and soles of the feet; for the extirpation of which, see the articles **WART** and **EXCRESCENCE**.

MYRMECOPHAGA, the **ANT BEAR**, in zoology, a genus of quadrupeds, of the order of the agriæ, the body of which

is

is covered with hair, and the ears roundish. There are three species of it; the one, called the great ant-bear, with three toes on the fore-feet, and five on the hinder; another, or lesser ant-bear, with four toes on the fore-feet, and five on the hinder; and a third, with only two toes on the fore-feet, and four on the hinder.

They are so called from feeding on ants, which it does by thrusting out its tongue upon an ant-hill, and drawing it into the mouth when covered with these creatures.

MYRMILLONES, in roman antiquity, a kind of gladiators, so called from their wearing the myrmillo, a sort of gallic armour.

MYROBALANS, a kind of medicinal fruit brought from the Indies, of which there are five kinds: 1. the citrine, of a yellowish-red, hard, oblong, and the size of an olive: 2. the black, or indian myrobalan, of the bigness of an acorn, wrinkled, and without a stone: 3. chebulic myrobalans, which are of the size of a date, pointed at the end, and of a yellowish-brown: 4. emblic, which are round, rough, the size of a gall, and a dark-brown: and, 5. belleric, which are hard, round, of the size of an ordinary prune, less angular than the rest, and yellow. Each of these kinds are slightly purgative and astringent; but Quincy observes, that the best of them are not worth regarding, since they rather clog than assist any composition.

MYRRH, a vegetable production of the gum or resin-kind, issuing by incision, and sometimes spontaneously, from the trunk and larger branches of a tree growing in Egypt, Arabia, and Abyssinia. The incisions are made twice a-year, and the myrrh oozing out, is received on rush-mats dispersed underneath.

Myrrh is sent over to us in loose granules of various sizes, from that of a peppercorn, to the bigness of a walnut. The generality of them, however, are from the size of a pea, to a little more than that of a horse-bean: these are sometimes roundish, but often irregularly long and contorted. The colour of myrrh is a reddish-brown, with more or less of an admixture of yellow, and in the purest pieces it is somewhat transparent. Its taste is bitter and acrid, with a peculiar aromatic flavour, but very nauseous: but its smell, tho' strong, is not disagreeable. It is to be chosen in clear pieces,

light, friable, and of the bitterest taste. Myrrh is of great use in medicine; it powerfully resolves and attenuates thick and viscid blood, and concremented bile, and glutinous humours, and is good in obstructions of the menses, and in infarctions of the viscera. It also promotes delivery and the expulsion of the secundines, and is good in asthmas, and in cases of tubercles of the lungs: it is of great service in the jaundice and in cachectic complaints: it destroys worms, strengthens the stomach, and dissipates flatulencies. Externally applied, it is discutient and vulnerary; it cleanses old ulcers, and disposes them to heal; but it gives many people the head-ach: and as it promotes discharges of blood, should never be given to persons subject to such discharges, as spitting of blood, or the like, or to women in the time of their pregnancy. It is administered either in pills, boluses, or tinctures; it not conveniently agreeing with any other forms.

MYRSINE, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of a single petal, divided into five semi-oval, obtuse, and connivent petals: the fruit is a roundish depressed berry, containing five cells, with a single seed in each.

MYRTIFORM, in anatomy, an appellation given to several parts, from their resembling myrtle berries: thus we meet with the myrtiform caruncles, and the myrtiform muscle of the nose, which arises near the incisivus of the upper lip, and is inserted into the alæ of the nose. See the article **CARUNCLE**.

MYRTLE, *myrtus*, in botany, a genus of the icosandria-monogynia class of plants; the corolla of which consists of five large, oval, and undivided petals; and its fruit is an oval, trilocular berry, with a single kidney-shaped seed in each cell.

Myrtle-berries, says Quincy, are very rough and astringent, not much prescribed in composition for inward use; but they enter several of the strengthening-plasters: the syrup of them is esteemed good against abortion, and in fluxes of all kinds.

MYRTUS, the *myrtle*, in botany. See the article **MYRTLE**.

MYSIA, the antient name of a province in Asia, being the north-west part of Natolia, or Asia Minor.

MYSTERY, something secret or concealed, impossible or difficult to comprehend. All religions, true or false, have their mys-

mysteries. The pagan religion was remarkably full of them. Ovid reckons it a great crime to divulge the mystic rites of Ceres and Juno. The eleusinia, or sacred rites of Ceres, solemnized at Eleusis, were called, by way of eminence, the mysteries; and so superstitiously careful were they to conceal these sacred rites, that if any person divulged any part of them, he was thought to have called down some divine judgment on his head, and it was accounted unsafe to abide under the same roof with him; and Horace declares, that he would not put to sea in the same ship with one who revealed the mysteries of Ceres. The pagan mysteries, it is true, were generally mysteries of iniquity, and concealed only because their being published would have rendered their religion ridiculous and odious. Thus the sacred writings often speak of the infamous mysteries of the pagan deities, in which the most shameful crimes were committed under the specious veil of religion.

The whole religion of the Egyptians was mysterious from the beginning to the end, and both their doctrines and worship wrapped up in symbols and hieroglyphics.

The religion of the Jews is supposed to be full of mysteries. The whole nation, according to St. Augustin, was a mystery, as it represented or was a type of the people of Christ, and the christian religion. Whatever was commanded or forbidden them was figurative, and their sacrifices, priesthood, &c. included mysteries. The prophecies concerning Jesus Christ in the jewish books, are likewise figurative and mysterious.

The christian religion has also its mysteries: but in the scripture language the word mystery is used with some latitude, and denotes whatever is not to be known without a divine revelation, and all the secret things which God has discovered by his ministers the prophets, by Jesus Christ and his apostles. The mysteries of the christian church are, the incarnation of the Word, the hypostatical union of the divine and human nature, the miraculous birth, death, and resurrection of the son of God, the doctrine of the trinity, &c. See the article INCARNATION, &c.

St. Paul often speaks of the mysteries of the christian religion; as the mystery of the gospel, the mystery of the cross of Christ, the mystery which was kept secret

since the world began: and he calls the preachers of the gospel, the stewards of the mysteries of God.

MYSTICAL, something mysterious or allegorical. Some of the commentators on the sacred writings, besides a literal, find also a mystical meaning. The sense of scripture, say they, is either that immediately signified by the words and expressions in the common use of language; or it is mediate, sublime, typical, and mystical. The literal sense they again divide into proper literal, which is contained in the words taken simply and properly; and metaphorical literal, where the words are to be taken in a figurative and metaphorical sense. The mystical sense of scripture they divide into three kinds: the first corresponding to faith, and called allegorical; the second to hope, called anagogical; and the third to charity, called the tropological sense. And sometimes they take the same word in scripture in all the four senses: thus the word Jerusalem, literally signifies the capital of Judæa; allegorically, the church militant; tropologically, a believer; and anagogically, heaven. So that passage in Genesis, *let there be light, and there was light*, literally signifies corporeal light; by an allegory, the Messiah; in the tropological sense, grace; and anagogically, beatitude, or the light of glory. See the article ANAGOGICAL, &c.

MYSTICS, a religious sect distinguished by their professing a pure, sublime, and perfect devotion, with an intire disinterested love of God, free from all selfish considerations, and by their aspiring to a state of passive contemplation.

MYTHOLOGY, *μυθολογια*, the history of the fabulous gods and heroes of antiquity, with the explanations of the mysteries or allegories couched therein. Lord Bacon thinks that a great deal of concealed instruction and allegory was originally intended in most part of the antient mythology: he observes, that some fables discovers a great and evident similitude, relation, and connection with the thing they signify, as well in the structure of the fable, as in the meaning of the names, whereby the persons or actors are characterized.

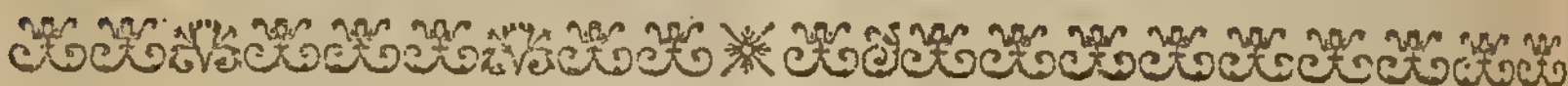
The same writer thinks it may pass for a farther indication of a concealed and secret meaning, that some of these fables are so absurd and idle in their narration, as to shew an allegory even afar off: but the argument of most weight upon

this subject he takes to be this, that many of these fables appear by no means to have been invented by the persons who relate them: he looks on them not as the product of the age, nor invention of the poets, but as sacred relics, as he terms them, gentle whispers, and the breath of better times, that from the tradition of more antient nations, came at length into the flutes and trumpets of the Greeks. He concludes, that the knowledge of the early ages was either great or happy: great if they by design made this use of trope and figure; or happy,

if, whilst they had other views, they afforded matter and occasion to such noble contemplations.

MYTULUS, the *muscle*, in natural history. See the article *MUSCLE*.

MYURUS, in medicine, an epithet for a sort of sinking pulse, when the second stroke is less than the first; the third than the second, and so on. Of this, there are two kinds; the first, when the pulse sinks so as never to arise; the other, when it returns again, and rises in some degree. Both are esteemed a bad presage.



N.

N or n, the thirteenth letter, and tenth consonant of our alphabet: it is a liquid, the sound of which is formed by forcing the voice strongly through the mouth and nostrils; being at the same time intercepted by applying the tip of the tongue to the forepart of the palate, with the lips open. It suffers no consonant immediately after it, in the beginning of words and syllables; nor any before it, except g, k, and s; as in *gnaw*, *knew*, *snaw*, &c. As a numeral, N stands for 900; and with a dash over it, thus *N̄*, for 900,000. N, or N^o, stands for numero, *i. e.* in number; and N. B. for nota bene, note well, or observe well.

Among the antient Romans, N denotes Nepos, Nonnius, &c. N. C. Nero Cæsar, or Nero Claudius; N. L. Non Lique; N. P. Notarius Publicus; and N B L. stands for nobilis.

NAAM, in law, the detaching or detraining a person's moveable goods; as where a man takes another man's beast for doing damage in his ground; or where it is done in consequence of another man's act, as when it is agreed, that in default of payment of some contract, it shall be lawful to distrain on lands charged therewith.

NAB, a river which rises in Franconia, and running through Bavaria, falls into the Danube above Ratisbon.

NABOB, a viceroy, or governor of one of the provinces of the Mogul's empire, in India. See the article *INDIA*.

NABONASSAR, or *Æra of NABONASSAR*, a method of computing time from the commencement of Nabonassar's reign. See the article *EPOCHÆ*.

The epocha of Nabonassar is of the greater importance, as Ptolemy and other astronomers account their years from it.

NABURG, a town of Germany in the palatinate of Bavaria; east long. 12° 7', north lat. 49° 22'.

NADAB, the sovereign pontiff, or high-priest of the Persians, whose dignity is the same as that of the musti among the Turks; with this difference only, that the nadab may divest himself of his ecclesiastical office, and pass to civil employments, which the musti is not allowed to do. See the article *MUSTI*.

The nadab takes place next after the atmath-dulet, or prime minister; he has two judges under him, called the scelik and the casi, who decide all religious matters, grant divorces, and are present at contracts and public acts, and these have deputies in all the cities of the kingdom.

NADIR, in astronomy, that point of the heavens which is diametrically opposite to the zenith, or point directly over our heads.

The zenith and nadir are the two poles of the horizon. See *HORIZON* and *POLE*.

Sun's NADIR, in astronomy, is the axis of the cone formed by the earth's shadow: it is thus called, because being produced, it gives a point in the ecliptic.

tic diametrically opposite to the sun.
NAERDEN, a town of Holland, situated at the south-end of the Zuyder-Sea, thirteen miles east of Amsterdam.

NÆVI, in surgery, marks or excrescences made on the skin of an infant before its birth, by the imagination of the mother. See the article **IMAGINATION**.

For the treatment of these, see the article **EXCRESCENCE**.

NAHUM, or *the prophecy of NAHUM*, a canonical book of the Old Testament.

Nahum, the seventh of the twelve lesser prophets, was a native of Elkoshai, a little village of Gallilee. The subject of his prophecy is the destruction of Nineveh, which he describes in the most lively and pathetic manner; his style is bold and figurative, and can hardly be exceeded by the most perfect masters of oratory. This prophecy was verified at the siege of that city by Assyages, in the year of the world 3378, 622 years before Christ.

The time of Nahum's death is unknown: the greek menologies, and the latin martyrologies, place his festival on the first of December.

NAIADS, in mythology, the nymphs of the fountains. See the article **NYMPH**.

NAIANT, in heraldry, a term used in blazoning fishes, when borne in an horizontal posture, as if swimming.

NAJARA, a town of Spain, fifty miles south of Bilboa.

NAJAS, in botany, a genus of the monoecia-monandria class of plants, the male corolla of which is monopetalous, and divided into four segments at the limb: the femal one has no flower-petals; and the fruit is an oval capsule, containing ovato-oblong seeds.

NAIL, *unguis*, in anatomy, a kind of bony excrescence growing on the fingers and toes of men, and several other animals. The number, figure, size, and colour of the nails need no explanation. The several parts of the nails have their several names: the extremity is called the apex; the opposite part of this is the root or base: near which there is a white part called the lunula, from its figure somewhat resembling a segment of a circle.

As to the substance of the nails, they are composed of the cutaneous papillæ, elongated and indurated, and firmly connected to one another in a longitudinal direction: for this reason, they are very sensible at the roots, where these pa-

pillæ are yet tender; but at the apex, where they are perfectly indurated, they may be cut without pain.

The papillæ, of which the nails are formed, arise out of the skin, not only at the root of the nail, but all over the greater part of its under surface. It is by this means that the nails are so firmly connected to the skin; and it is owing to the continual accession of more and more papillæ, as they approach towards the apex, that they become harder and firmer in that part. They may easily be separated intire, from dead subjects by hot water.

We are next to enquire into the manner of their nutrition. As the rest of the papillæ of the cutis have their vessels, by which they are nourished; so also the papillæ which form the nails, have their vessels for conveying nourishment to them at the base: but as these papillæ do not, in their own form, constitute the body of the nail, but become indurated as they are elongated, and seem only the roots or bases of hard and rigid fibres; so these indurated parts of them have fewer than the more tender; but yet enough for their nutrition are continued along them. Their growth is by means of these, and it continues as long as the person lives. It has been said, that they grow after the person is dead; but Heister thinks this an error.

The uses of the nails are, 1. To strengthen and defend the extremities of the fingers and toes, that they may not be so easily hurt by external accidents as they otherwise would have been. 2. To assist the fingers in the more readily laying hold of little things, and in holding them the more firmly. 3. To be of use in cleaning the skin from any accidental foulnesses on its surface. 4. On the toes, they serve to make us tread the firmer, and to prevent the painful collision their ends would otherwise be almost continually subject to.

Among the various animals, the claws, which are perfectly analogous to our nails, serve them for seizing and tearing their prey, and for climbing trees: the squirrels, &c. make the latter use of them; the beasts of prey, in general, the former. Among the other animals, the hoofs of some serve them as shoes to walk on; in others, they answer both this purpose and that of offensive weapons, as in the horse, to strike with.

NAILS, in building, &c. small spikes of iron,

iron, brass, &c. which being drove into wood, serve to bind several pieces together, or to fasten something upon them. The several sorts of nails are very numerous; as 1. back and bottom nails; which are made with flat shanks to hold fast, and not open the wood. 2. Clamp-nails, for fastening the clamps in buildings, &c. 3. Clasp-nails; whose heads clasping and sticking into the wood, render the work smooth, so as to admit a plane over it. 4. Clench-nails, used by boat and barge-builders, and proper for any boarded buildings that are to be taken down; because they will drive without splitting the wood, and draw without breaking; of these there are many sorts. 5. Clout-nails, used for nailing on clouts to axle-trees. 6. Deck-nails, for fastening of decks in ships, doubling of shipping, and floors laid with planks. 7. Dog nails, for fastening hinges on doors, &c. 8. Flat-points, much used in shipping, and are proper where there is occasion to draw and hold fast, and no conveniency of clenching. 9. Jobent-nails, for nailing thin plates of iron to wood, as small hinges on cupboard-doors, &c. 10. Lead-nails, for nailing lead, leather, and canvas to hard wood. 11. Port-nails, for nailing hinges to the ports of ships. 12. Pound-nails, which are four-square, and are much used in Essex, Norfolk, and Suffolk, and scarce any where else, except for pailing. 13. Ribbing-nails, principally used in ship-building, for fastening the ribs of ships in their places. 14. Rose-nails, which are drawn four square in the shank, and commonly in a round tool, as all common two-penny nails are; in some countries all the larger sort of nails are made of this shape. 15. Rother-nails, which have a full head, and are chiefly used in fastening rother-irons to ships. 16. Round head nails, for fastening on hinges, or for any other use where a neat head is required; these are of several sorts. 17. Scupper-nails, which have a broad head, and are used for fastening leather and canvas to wood. 18. Sharp-nails; these have sharp points and flat-shanks, and are much used, especially in the West-Indies, for nailing soft wood. 19. Sheathing-nails, for fastening sheathing-boards to ships. 20. Square-nails, which are used for hard wood, and nailing up wall fruit. 21. Tacks, the smallest of which serve to fasten paper to wood; the middling for

wool-cards, &c. and the larger for upholstery and pumps.

Nails are said to be toughened when too brittle, by heating them in a fire-shovel, and putting some tallow or grease among them.

Nails are sold at six score to the hundred: in lathing, 500 are usually allowed to a bundle of five feet laths, and 600 to a bundle of four feet laths: in flooring, 200 are sufficient for a square of flooring. The duties on nails imported, are as follow: chair nails, on importation, pay the thousand 2 s. 6 $\frac{80}{100}$ d. and draw back, on exportation, 2 s. 3 d. more if brass, 7 $\frac{1}{2}$ d. the whole of which is drawn back on exportation. Copper-nails the ten thousand, pay, on importation, 2 s. 6 $\frac{80}{100}$ d. and draw back, on exportation, 2 s. 3 d. more for every 112 pounds, 16 s. 4 $\frac{87\frac{1}{2}}{100}$ d. the whole drawn back on

being exported. Harness-nails, the ten thousand, pay on importation, 3 s. 10 $\frac{20}{100}$ d. and draw back, on exportation, 3 s. 4 $\frac{1}{2}$ d. more if brass, 11 $\frac{1}{4}$ d. and draw back, the whole on exportation. Head-nails, the barrel, pay, on exportation, 1 l. 10 s. 9 $\frac{60}{100}$ d. and draw back, on exportation, 1 l. 7 s. and small nails in the same proportion for the half barrel. Rose-nails, and sadler's-nails, the ten thousand pay, on importation, 2 s. 6 $\frac{80}{100}$ d. and draw back, on exportation, 2 s. 3 d. more if brass, 7 $\frac{1}{2}$ d. and draw back, the whole. Sprig-nails, the ten thousand, pay on importation, 1 s. 3 $\frac{40}{100}$ d. and draw back, on exportation, 1 s. 1 $\frac{1}{2}$ d. Besides the above duties, those made of iron pay for every 112 pounds weight, on importation, 4 s. 8 $\frac{1}{4}$ d. which is drawn back on exportation.

NAIL, is also a measure of length, containing the sixteenth part of a yard.

NAIRN, a borough and port-town of Scotland, eighteen miles east of the town of Inverness.

NAISSANT, in heraldry, is applied to any animal issuing out of the midst of some ordinary, and shewing only his head, shoulders, fore feet and legs, with the tip of his tail, the rest of his body being hid in the shield, or some charge upon it; in which it differs from issuant, which denotes a living creature arising out of the bottom of any ordinary or charge.

NAKED, in architecture, is the surface or plain from whence the projections arise.

arise, or which serves as a ground to the projectures. Thus, we say the foliages of a capital ought to answer to the naked of a column, and that a pilaster ought to exceed the naked of the wall by so many inches.

NAKED FIRE, in chemistry, is an open fire; or one where a vessel is immediately exposed to the fire. See the articles **FIRE** and **HEAT**.

NAKED SEEDS, in botany, are those that are not inclosed in any pod or case.

NAKIB, the deputy of the cadilescher of Egypt. See **CALILESCHER**.

NAKOUS, a musical instrument, consisting of two brass-plates, which are suspended by strings, and struck together so as to beat time: they are used in the coptic churches in Egypt, and in the mahometan processions.

NAKSIVAN, a city of Persia, in the province of Chirvan; east long. 45° , north lat. $39^{\circ} 15'$.

NAMA, in botany, a genus of the pentandria digynia class of plants, the flower of which consists of five petals; and the fruit is a capsule of an oval figure formed of two valves, and containing only one cell.

NAMATION, the same with **naam**. See the article **NAAM**.

In Scotland, this word is particularly used for impounding of cattle. See **POUND**.

NAME, *nomen*, denotes a word whereby men have agreed to express some idea; or which serves to signify a thing or subject spoken of. This the grammarians usually call a noun, though their noun is not of quite so great an extent as our name. See the article **NOUN**.

Names are either proper or appellative. Proper names are those which represent some individual thing or person, so as to distinguish it from all other things of the same species, as Aristotle, which represents a certain philosopher. Proper names are either called Christian, as that given us at baptism, or surnames; the first imposed for the distinction of persons, answering to the roman prænomen; the second for the distinction of families, answering to the nomen of the Romans, and the patronymicum of the Greeks. See the article **PATRONYMIC**, &c.

The Jews gave the name at the circumcision, viz. eight days after the birth: the Romans to females the same day, and to males on the ninth, at which time they held a feast, called nominalia. Since

christianity has obtained, most nations have followed the Jews, baptizing and give the name on the eighth day after the birth, but our ancestors till of late baptized and gave the name on the birthday.

The first imposition of names was founded on different views among different people; the most usual was, to mark the good wishes of the parents, or to entitle the children to the good fortune a happy name seemed to promise, hence Victor, Castor, Faustus, &c. The antient Britons, Camden says, generally took their names from colours, because they painted themselves. When they were subdued by the Romans, they took roman names: the Saxons introduced the german names; the Danes brought with them their names; and the Normans their names. The various names antiently, or at present obtaining among us, from what language or people soever borrowed, are explained by Camden in his remains. In monasteries, the religious assume new names at their admittance, to shew they are about to lead a new life, and have renounced the world, their family, and even their name, as brother Henry of the holy sacrament, sister Mary of the incarnation, &c. The popes also change their names at their exaltation to the pontificate; and it is frequent in Italy to join the name of some saint in a kind of devotion to the christian name.

Appellative, or general names, are those which signify common ideas, or which are common to several individuals of the same specie, as a horse, animal, &c. See the article **GENERAL TERMS**.

Specific NAME. See the article **SPECIFIC**.

NAMIUM, or **NAAM**, in law. See the article **NAAM**.

NAMUR, a strong city of the Austrian Netherlands, capital of the province of Namur, situated at the confluence of the Sambre and Maese: east long. $4^{\circ} 50'$, north lat. $50^{\circ} 30'$.

The county of Namur is bounded by Brabant on the north; by Liege and Luxemburg, on the east; and by the province of Hainault on the south and west.

NAMUR-MARBLE, a name given by our artificers to a species of black marble, which is very hard, and capable of a good polish, but has no variegations of any other colour. It is common in Italy, France,

France, and Germany, and is the species called the lucullan marble by the Romans. See the article MARBLE.

NANCY, the capital of Lorraine in Germany, situated in east long. 6° , north lat. $48^{\circ} 44'$.

NANFIO, one of the islands in the Archipelago, sixteen miles round, and situated in east long. 26° , north lat. 35° .

NANGASAQUI, a city on the west side of the island of Bungo, situated in east long. 130° , north lat. $32^{\circ} 30'$.

NANKING, the capital of the province of Nanking, and formerly of the empire of China, is situated in east long. $118^{\circ} 30'$, north lat. 32° .

NANSAMUND, a county of Virginia, in north America, south of the Isle of Wight-county; through which the river of Nansamund runs.

NANTZ, a city of France, in the province of Brittany, situated on the river Loire, in west long. $1^{\circ} 30'$, north lat. $47^{\circ} 15'$.

NANTUCKET, an island on the coast of New-England in North-America, situated in west long. 70° north lat. 41° .

NANTWICH, a market-town of Cheshire, situated seventeen miles south-west of Chester.

NAPÆA, in botany, a genus of the monadelphia-polyandria class of plants, the calyx of which is a single leaved round permanent perianthium, cut into five segments; the corolla consists of five oblong, concave petals, connected by long unguis; the fruit consists of a number of capsules, each containing a single kidney-shaped seed.

NAPE, a name used for the hind part of the neck, supposed to be on account of the short hair growing there, in resemblance of the nap of a cloth.

NAPHTHA, in natural history, a fluid mineral body, of a thin consistence, bright and pellucid, of a strong smell, very readily inflammable, and when pure, burning away without leaving any residuum.

The naphtha is found in considerable quantities floating on the water of certain springs, principally breaking out at the sides of hills in Persia, Tartary, and some parts of the empire of China, where if a lighted candle be held near the surface, it takes fire and overspreads the surface of the water for a great extent, with a strong white flame, and emits a very disagreeable smell. The genuine naphtha is very rare in Europe; it is not known to be any where naturally pro-

duced here, and what we see of it is generally sophisticated. Distilled by the retort, it yields an oil somewhat thinner than it was originally, and of a weaker smell. The substance remaining at the bottom of the retort, has much the resemblance of amber; and Dr. Hill thinks it highly probable, that the origin of all the amber in the world is from the same sort of principle; nay he tells us that he has succeeded so far in an attempt to make amber by this fluid and an acid drawn from the crude pyrites, that he has produced a friable somewhat pellucid matter, having all the properties of amber except its hardness and clearness, and yielding a true salt and oil of amber on distillation. See the article AMBER.

The medicinal virtues of the naphtha are the same with the common petroleum, but in a more remiss degree. It is used externally on many occasions in Persia; and is taken inwardly, a few drops for a dose, in colics. The principal use made of it, however, is burning in lamps, for which purpose it is very proper.

NAPIER's, or NEPER's BONES. See the article NEPER.

NAPLES, the capital of the kingdom of Naples: situated in east long. 15° , north lat. 41° .

The kingdom of Naples is one of the Sicilies; it is the south-east part of Italy, and it is situated between 14 and 19° east long. and between 38 and 43° north lat. being bounded by the gulph of Venice on the north-east, by the Mediterranean sea on the south-east, by Sicily and the Tuscan-sea on the south-west, and by the pope's territories on the north-west; and divided from the islands of Sicily only by the narrow streight or pharo of Messina.

NAPLES YELLOW, the common name in the colour shops of London, and among our painters, for the ochre called Giallino. See the article GIALLOLINO.

NAPOLI DE MALVASIA, a port-town of the Morea, situated at the entrance of the gulph of Napoli de Romania, and forty miles south-east of that city.

NAPOLI DE ROMANIA, a city and port-town of European Turkey, in the province of the Morea, situated at the bottom of a bay of the same name in the Archipelago, in east long. $23^{\circ} 20'$, north lat. $37^{\circ} 30'$.

NARBARTH, a town of Pembroke-shire, in south-Wales, situated ten miles north-east of Pembroke.

NARBONE,

NARBONE, a city of France, in the province of Languedoc: situated in east long. $2^{\circ} 40'$, north lat. $43^{\circ} 18'$.

NARBOROUGH, an island of South-America, in the Pacific-Ocean, situated on the coast of Chili, in west long. 85° , south lat. 45° .

NARCISSUS, the **DAFFODIL**, in botany, a genus of the hexandria monogynia class of plants, the corolla whereof consists of a nectarium formed of one leaf of a cylindric or funnel shape, coloured at the top and wide, curled and plicated at the mouth, and of six oval acuminate plane petals affixed externally to the tube of the nectarium above its base: the fruit is a roundish obtusely trigonal capsule, formed of three valves, and containing three cells, in which are a number of round appendiculated seeds, with a columnar receptacle.

The root of this plant is emetic, vulnerary and detergent.

NARCOTICS, in medicine, soporiferous medicines, which excite a stupefaction. See the article **OPIATES**.

Narcotics, called also hypnotics, anodynes, or stupefactive, are said, by Hoffman, to be such kind of remedies as, by their subtle, noxious, and deleterious exhalations, diminish, or quite destroy the sense and motion of the solid parts. Among narcotics, the most eminent are those which are usually prepared for medicinal uses of the whole poppy, especially opium; as also all those prepared of mandragoras, hyoscyamus, stramonium, and datura. These, says the above-mentioned author, are not without reason reckoned poisons, since they exert their noxious influence in a short space of time, when taken in a small quantity; and a quantity a little larger than ordinary proves mortal. Besides, their principal operation is on the most noble parts of the body, which are the organs of sense and motion; and moreover, they act by means of an element quite opposite to nature, a noisome sulphureous vapour, by which they diminish to a considerable degree, or quite destroy the sense and motion of the motive fibres. The elements by which narcotics act, are of an highly volatile and penetrating nature, since they deeply insinuate themselves like a vapour into the pores of the membranes and nerves, and by contaminating that most pure and moveable fluid, deprive, by little and little, the solids of their tone and motion.

Narcotics act on the nervous membranes of the stomach and intestines, principally by means of a vaporous and fetid sulphur; for as the stomach and intestines first and immediately feel the force and efficacy of remedies, they are so much the more liable to suffer from the influence of medicines which are of a stronger and more penetrating nature than ordinary. These medicines have also a mighty influence on the membranes of the brain, where, by greatly diminishing the spring and systole of the arteries, they cause stagnation of their blood therein, with distensions of the vessels of the head, by which means they induce a torpor, drowsiness, deliriousness, with frightful and troublesome dreams. These medicines were therefore suspected, by the wisest physicians among the ancients, in the cure of diseases, on account of their deleterious quality.

NARDO, a port-town of Italy, in the kingdom of Naples: east longitude 19° , north latitude $40^{\circ} 33'$.

NARDUS, **SPIKENARD**, in botany, a genus of the triandria-digynia class of plants, the corolla whereof is formed of two valves; the exterior is long and of a lanceolato-linear figure; it terminates in an arista or awn, and contains within it the other, which is smaller, and terminates in a shorter awn: the seed is single, of a linear oblong figure, narrower at top than at bottom, and pointed at each end; the corolla surrounds it by way of a pericarpium.

This plant is cephalic and stomachic; it is recommended in nephritic cases, and as a promoter of the menses. It is also given in chronic cases to remove obstructions of the viscera: however, the modern practice does not use it much, except as an ingredient in some of the officinal compositions. It has a very fragrant aromatic smell and taste.

NARRATION, in oratory and history, a recital or rehearsal of a fact as it happened, or when it is supposed to have happened.

Narration is of two kinds, either simple or historical, as where the auditor or reader is supposed to hear or read of a transaction at second hand; or artificial and fabulous, as where their imaginations are raised, and the action is as it were re-acted before them. The narration, according to the writers of rhetoric, makes the second part of a just speech or harangue, viz. that immediately

ately following to the exordium. It makes the whole history, abating for the occasional reflections, episodes and digressions. Cicero requires four virtues in a narration, *viz.* perspicuity, probability, brevity, and sweetness. The narration is rendered perspicuous by observing the order of time, by using none but proper and known terms, and by reciting the action uninterruptedly. It is rendered probable by the credibility of the narrator, by the simplicity and openness of the narration, by avoiding every thing far remote from the common sense and opinion of mankind, and by a precise detail of circumstances. It is rendered brief by taking it up no higher than is necessary, nor fetching it back; and by avoiding trivial circumstances. Lastly, it is rendered sweet by using smooth, numerous, and well-founding words; by arranging them so as to avoid any hiatus or clashing; by the greatness, the novelty, and unexpectedness of the things related; and by enriching it with tropes and figures. See HISTORY, ORATORY, TROPE, &c.

NARRATION, in poetry, is used for the action, or event, that make the subject of an epic poem.

For the virtues of the poetic narration, see the article EPIC.

NARWAL, in ichthyology, the unicorn-fish, so called from a long wreathed tooth, ten or more feet in length, which has more the appearance of a horn than of a tooth; though it be really a tooth fixed in the gomphosis of the upper jaw, altogether in the manner of other teeth: hence some have called it monodon, which is certainly a more proper name than that of the unicorn-fish.

The narwal is a fish of the whale-kind, often growing to twenty five feet in length, but is more commonly found from sixteen to twenty.

NARVAR, a city of the hither India, the capital of the province of Narvar: east long. 79° , north lat. 25° .

NASALIA, in medicine, a sort of remedies to be taken by the nose, called also errhines. See the article ERRHINES.

NASIAS, in anatomy, a thin bone making the upper part of the nose. See the article NOSE.

NASSAU, the capital of the county of the same name in Germany: east long. $7^{\circ} 25'$, north lat. $50^{\circ} 21'$.

NASUS, in ichthyology, the cyprinus with a nasiform snout, and fourteen rays in the pinna ani. See CYPRINUS.

NATA, a port-town of Darien, situated on the bay of Panama.

NATAL TERRA, a country on the south-east coast of Africa, between 23° and 30° of south latitude, and between 25° and 35° of east longitude.

NATALIS, or **NATALIS DIES**, properly signifies a man's birth-day; but was used by the heathens to signify the feast held on the anniversary of the birth-day of an emperor, whence it came in time to signify any sort of feast; and the primitive christians used it in this sense.

Ludi NATALITII, **NATAL-GAMES**, those introduced on the anniversaries of the birth-days of great men.

NATES, in anatomy, a term expressing those two fleshy exterior parts of the body, vulgarly called the buttocks.

NATES CEREBRI, two circular protuberances of the brain, situated on the back-side of the medulla oblongata, near the cerebellum. See BRAIN and MEDULLA.

NATION, a collective term, used for a considerable people inhabiting a certain extent of land, confined within fixed limits, and under the same government. In some universities the word nation is used for a distinction of the scholars, the professors and colleges: thus the faculty of arts in the university of Paris, consists of four nations; *viz.* that of France, that of Normandy, that of Picardy, and that of Germany; which last comprehends all foreign nations, as the English, Italians, &c.

NATIVE, a person considered as born in a certain place which was the proper residence of his parents, and where he received his education.

NATIVE, or **NATIVUS**, in our antient law-books, signifies a person born in a state of villainage, in contradistinction to a bonds-man, or one who became a villain by his own act and deed.

NATIVITY, or **NATAL-DAY**, the day of a person's birth. The word nativity is chiefly used in speaking of the saints, as the nativity of St. John the Baptist, &c. But when we say the Nativity, it is understood of that of Jesus Christ, or the feast of Christmas. See the article CHRISTMAS.

NATIVITY, in old law-books, signifies villainage or servitude.

NATIVITY, in astrology, the situation of the heavens, and particularly of the twelve houses at the moment of a person's birth. See the article HOROSCOPE.

NATIVO HABENDO, a writ which antiently

tiently lay for apprehending a villain and restoring him to his lord.

NATOLIA, the modern name of the lesser Asia; being the most westerly part of Turkey in Asia, and consisting of a large peninsula, which extends from the river Euphrates, as far as the Archipelago, the sea of Marmora, the straits of Gallipoli and of Constantinople, which separate it from Europe on the west. It is bounded on the north by the Black sea, and on the south by the Mediterranean sea.

NATRIX, in zoology, a species of serpent with one hundred seventy-six scuta upon the abdomen, and sixty squamæ on the tail. See the article **SERPENT**.

NATRUM, the nitre of the ancients, in natural history, is a genuine, pure and native salt, extremely different from our nitre, and indeed from all the other native salts; it being a fixed alkali, plainly of the nature of those made by fire from vegetables, yet capable of a regular crystallization, which those salts are not. It is found on the surface of the earth, or at very small depths within it, and is naturally formed into thin and flat cakes or crusts, which are of a spongy or cavernous substance, very light and friable, and when pure, of a pale brownish-white; but as its spongy texture renders it very subject to be fouled by earth received into its pores, it is often met with of a deep dirty-brown, and not unfrequently reddish.

Natrum, whether native or purified, dissolves in a very small quantity of water; and this solution is, in many parts of Asia, used for washing; where it is also made into soap by mixing it with oil. Natrum reduced to powder, and mixed with sand or flints, or with any other stone of which crystal is the basis, makes them readily run into glass. Gold heated red-hot, and sprinkled with a small quantity of this salt, melts immediately; silver ignited and sprinkled with it, melts in the same manner; as does also iron, copper, and the regulus of antimony, which melt much more easily than they otherwise would do. Mercury will not be mixed with it by any art, and indeed will not amalgamate with metals if only a little of this salt be added. It is found in great abundance in many parts of Asia, where the natives sweep it up from the surface of the ground and call it soap-earth. The earliest account we have of it is in the Scriptures, where we find that

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the salt called nitre in those times would ferment with vinegar, and had an absterfive quality, so that it was used in baths and in washing things. Solomon compares the singing of songs with a heavy heart, to the contrariety of vinegar and nitre; and Jeremiah says, that if the sinner wash himself with nitre his sin is not cleansed off. These are properties that perfectly agree with this salt, but not at all with our salt-petre.

NATTA, in surgery, a tumour of the oedematous kind. See **OEDEMA**.

NATURAL, in general, something that relates to nature. See **NATURE**.

Natural-children are those born out of lawful wedlock.

The natural-functions, are those actions whereby the aliments are changed and assimilated so as to become a part of the body. See the articles **FUNCTION**, **DIGESTION**, **CHYLIFICATION**, &c.

NATURAL HISTORY, a description of the productions of the earth, air, water, &c. See the articles **EARTH**, &c.

The natural-history of any one place is a very extensive subject, which, according to Mr. Boyle, may be conveniently reduced to four heads, *viz.* the things that regard the heavens, the air, the waters, and the earth.

Of the first class, are the longitudes and latitudes of places, the lengths of the longest and shortest days and nights; the climates, parallels, &c. what fixed stars are seen, and what are not seen there.

About the air may be observed, its temperature, as to the first four qualities, and the measure of them; its weight, clearness, and refractive power; its subtilty or coarseness; its abounding with or wanting an esurine salt; its variations according to the seasons of the year, and the times of the day; what duration the several kinds of weather usually have; what meteors it is most or least apt to breed; and in what order they are generated, and how long they generally last; what winds it is most subject to; whether any of them be stated or ordinary; what diseases are said to be epidemical, or depending on the state and condition of the air; what other diseases it is subject to, wherein the air may be supposed to have some share; what is the usual salubrity of it, and what sort of constitutions it agrees with, what does not. See the article **AIR**.

About the waters, it may be proper to observe the sea, its depth, tides, cur-

rents, saltness, and other qualities; next the rivers will come under consideration, their depth, length, course, inundation, and the goodness or badness of their waters, with their gravity, and other peculiar qualities; after these, the lakes, springs, ponds, &c. are to be considered, especially the mineral waters, their kinds, qualities and virtues, and the manner of trying them: the inhabitants of the waters may follow here; and the particular kinds of fish that are found there, whether of the sea or rivers, are to be mentioned, with an account of their stores, bigness, goodness, seasons of perfection, haunts, peculiarities of any kind relating to them, and the manner of taking them, especially when there is any thing singular in it.

The things relating to the earth, are last to be examined: these are, first the earth itself, then its inhabitants, and its various productions, whether external or internal. In the earth itself may be observed, its dimensions, situation east, west, north and south; its figure; its plains and valleys, and their extent; its hills and mountains, and the height of the tallest, both in reference to the neighbouring valleys and plains, and to the level of the sea; as also whether the mountains lie scattered, or are disposed in ridges; and if of the latter kind, whether they run east, west, north or south. What promontories also, and what fiery or smoking hills it has, if any: whether the country be coherent, or much broken into islands: what the magnetical declination is in several places, and the variation of that declination in the same place, and if those be considerable; what may be conjectured as the occasions of them, whether the vicinity of iron-mines, of subterraneous fires, or what else. What the nature of the soil is, whether clayey, sandy, or of good mould; and what vegetables, plants and trees best agree with it and succeed in it, what worst. By what particular contrivances the inhabitants improve the advantages, or remedy the disadvantages of the soil; and what hidden qualities the soil may have. The inhabitants of the earth are then to be considered, both natives, and strangers that have been long settled there; and in particular, their stature, colour, features, strength, agility, or defects of these; and their complexions, hair, beauty, and the like; their diet, inclinations and customs, so far as they

are not owing to education; the fruitfulness or barrenness of the women; their hard or easy labours; the diseases they are most subject to, and any remarkable symptoms attending them.

As to the external productions of the earth, the enquiries are to be these: what grasses, grains and fruit it best produces: the herbs, flowers, and timber-trees; and the coppices, groves, forests and woods the country has or wants; what peculiarities are observable in any of them; what soils they most like or dislike, and with what culture they thrive best. Then what animals the country has or wants, both as to wild beasts and birds of prey, and as to poultry and cattle of all sorts; and particularly, if they have any animals that are not common, or any thing particular in those they have. After those, the subterraneous stores are to be examined; what minerals the earth affords, and what it wants: then what quarries of stone, and in what manner they lie: what clays and earths are found there; as, clays, marles, fuller's earths, earths for tobacco-pipes, earth for potter's wares, medicinal earths: what other mineral productions it yields, whether coals, salt-mines, or salt-springs, alum, vitriol, sulphur, &c. What metals the country yields, with a description of the mines of them; their depths, numbers, situations, signs, waters, damps, quantities of ores, goodness of the ores, and the ways in use for the reducing them to metals.

To these general heads should be added, inquiries into traditions in the country, of any thing relating to it, whether peculiar to it, or only more common there than elsewhere; and where these require learning or skill in the answer, the utmost care is to be taken to put the people in a way to give their accounts in a satisfactory manner; for a false or bad account of any thing, is always much worse than no account at all.

NATURAL INCLINATIONS, are the tendencies of our minds towards things seemingly good. See the articles **GOOD** and **PASSIONS**.

NATURAL PHILOSOPHY, that which considers the powers and properties of natural bodies, and their mutual actions on one another.

The business of natural philosophers, says Boerhaave, is to communicate a solid and accurate knowledge of all the bodies in being, and all the affections thereof.

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Nor can this science be acquired otherwise than by observing, by means of our senses, all the objects which the author of nature has made cognizable thereto: hence, the first and principal part of this science is to collect all the manifest and sensible appearances of things, and reduce them into a body of natural history. Now there are two ways of making such observations; the first when we view things nearly as they happen to turn up, without any design or intervention of our own; in which way no great improvements can be expected in the art, because chance having here the direction, only exhibits occasional or extemporary properties: the other method is, when, after a thorough acquaintance with bodies, we apply them to other bodies equally known, diligently attending to the result, and observing whether any thing new arises. See the article EXPERIMENTAL PHILOSOPHY.

NATURAL, in music, is a term variously used: thus natural music is the same with vocal, in opposition to artificial music, or that performed on instruments. A song is also called natural, when its notes move easily and gracefully, the voice or instrument being nowise forced or strained. Natural harmony is that produced by the natural and essential chord of the mode. See the articles MODE and HARMONY.

A natural note is used to contradict those flats and sharps that are used at the beginning of a stave; and in such case, it must be taken exactly as in the gamut. For the character of this note, see the article CHARACTER.

NATURAL, in heraldry, is when animals, fruits, flowers, &c. are blazoned with their natural colours.

NATURALIST, a person well versed in the study of nature, and the knowledge of natural bodies, especially in what relates to animals, vegetables, metals, minerals, and stones. See the article NATURAL PHILOSOPHY.

NATURALIZATION, in law, the act of naturalizing an alien, or placing him in the condition of a natural born subject. In England, this is done by act of parliament; but none can be naturalized before they have received the sacrament of the church, and taken the oaths of allegiance and supremacy. A person who is naturalized may have lands by descent, as heirs at law, as well as obtain them by purchase: but they are disabled

from being of the king's privy council, or of holding offices, 7 Jac. I. 12 W. III. c. 2. By a late statute it is ordained, that all children born out of the king's dominions, whose fathers were or are natural subjects to this kingdom at the time of their birth, shall be adjudged natural-born subjects of this realm, except children of parents who are attainted of treason, or that are in the actual service of a foreign prince at enmity with us. 4 Geo. II. c. 2. By an act of 13 Geo. II. all Jews who have resided in the british colonies in America, without being absent two months at any one time, are declared naturalized without their receiving the sacrament of the Lord's supper.

NATURALS, *res naturales*, among physicians, whatever naturally belongs to an animal, in opposition to non-naturals. See the article NON-NATURALS.

NATURE, *natura*, according to Mr. Boyle, has eight different significations; it being used, 1. For the author of nature, whom the schoolmen call *natura naturans*, being the same with God. 2. By the nature of a thing, we sometimes mean its essence; that is, the attributes which make it what it is, whether the thing be corporeal or not; as when we attempt to define the nature of a fluid, of a triangle, &c. 3. Sometimes we confound that which a man has by nature, with what accrues to him by birth; as when we say, that such a man is noble by nature. 4. Sometimes we take nature for an internal principle of motion; as when we say, that a stone by nature falls to the earth. 5. Sometimes we understand, by nature, the established course of things. 6. Sometimes we take nature for an aggregate of powers belonging to a body, especially a living one; in which sense physicians say, that nature is strong, weak, or spent; or that, in such and such diseases, nature left to herself will perform the cure. 7. Sometimes we use the term nature for the universe, or whole system of the corporeal works of God; as when it is said of a phoenix, or chimera, that there is no such thing in nature. 8. Sometimes too, and that most commonly, we express by the word nature a kind of semi-deity, or other strange kind of being.

If, says the same philosopher, I were to propose a notion of nature, less ambiguous than those already mentioned, and with regard to which many axioms, re-

lating to that word, may be conveniently understood, I should first distinguish between the universal and the particular nature of things. Universal nature I would define to be the aggregate of the bodies that make up the world, in its present state, considered as a principle; by virtue whereof they act and suffer, according to the laws of motion, prescribed by the author of all things. See the articles BODY, INERTIA, MOTION, &c. And this makes way for the other subordinate notion; since the particular nature of an individual consists in the general nature, applied to a distinct portion of the universe; or, which is the same thing, it is a particular assemblage of the mechanical properties of matter, as figure, motion, &c.

Those who desire a more particular discussion of each of these opinions, may consult Boyle's Free Inquiry into the vulgar notion of nature.

NAVAL AFFAIRS, comprehend whatever relates to navigation, ship-building, sailors, &c. See the articles NAVIGATION, and *Construction* of SHIPS.

The history of the naval affairs of any one state is a very comprehensive subject, much more that of all nations. Those who would be informed of the maritime affairs of England, and the figure it has made at sea in all ages, may find abundance of curious matter in Selden's *Mare Clausum*; and from his time to ours, we may trace a series of facts in Lediard's and Burchet's *Naval History*.

Not only the preservation of that share of commerce we at present possess, but its future advancement, and even the very being of Great Britain, as an independent empire, and a free people, depend no less on the good condition and the wise regulation of our naval affairs, than on the superiority of its maritime power: and that the legislature has been ever attentive to this great and important object, will appear from the following account of the laws that have been enacted relating to the naval affairs of Great Britain.

So early as 5 Rich. II. c. 3. it was enacted, that none of the king's subjects should bring in or carry out any merchandize, but in english ships, on pain of forfeiting all the merchandize otherwise conveyed, or the value thereof: but 6 Rich. II. ordains, that the above statute shall only take place where able ships belonging to the king's subjects are

to be found; for where they are not to be had, the merchants are allowed to hire other ships. By 4 Hen. VII. c. 10. it was enacted, that no Gascoign or Guienne-wines, &c. should be imported into this realm but in english vessels: and that none should freight any merchandize in any stranger's ship, if he could have sufficient freight in a denizen's ship, under the penalty of forfeiting all merchandize not thus shipped, to be divided between the king and the seizer: but this act, so far as it related to the above wines, was repealed by the statute 32 Hen. VIII. c. 14. and a rate was ordered of what should be paid for the freight of the several sorts of merchandize in ships, from the port of London to other places, and from thence to London. By 1 Eliz. c. 13. it was enacted, that if the owner of any merchandize should, in the time of peace, embark or unload any part thereof, (masts, pitch, tar and corn only excepted) out of, or into any foreign ship, he should pay custom as an alien.

By the act of navigation, 12 Car. II. c. 18. it is enacted, that no goods shall be imported into, or exported out of, any territories belonging to, or that may hereafter belong to his majesty, his heirs and successors, in Asia, Africa, or America; in any other ships besides such as belong to the people of England, Ireland, Wales, or the town of Berwick upon Tweed, and whereof the master and three-fourths of the mariners are English, on pain of forfeiting both the ship and lading, one third part to the king, another to the governor of the country where such default shall be, if seized there, otherwise that third also to the king, and the other third to him that will seize or sue for the same. And commanders at sea, having the king's commission, are to bring in as prize all such ships, and on their being condemned, one moiety is to be for the use of such commanders and their companies, and the other moiety to the king. No goods of the growth or manufacture of Muscovy, or of the produce of the turkish empire, shall be imported into England, Ireland, &c. in any ship or vessel not english built, or not belonging to the people of England, Ireland, &c. and navigated as aforesaid; except vessels built at the place from whence the goods came, or of such port where they can only be, and usually are shipped, on pain of forfeiting the ship and

and goods: and all wines of the growth of France and Germany, and divers goods and merchandize from Spain, Portugal, Russia, &c. which shall be imported into the places aforesaid, in any other ship than what doth belong to England, Ireland, &c. and are navigated as aforesaid, shall be deemed alien's goods, and pay accordingly. And no foreign-built vessel shall pass as a ship belonging to England, Ireland, Wales, &c. till the owner makes it appear to the chief officer of the customs, in the port next to the place of his abode, that he is not an alien, and take an oath that it was *bona fide* bought of such persons, expressing the sum given, and the time and place when and where, &c. and that no foreigner has a share in it. Also none shall load in any bottom, if strangers are owners, part-owners, or master, and of which three fourths of the mariners at least are not English, any goods whatsoever from one port or creek of England, Ireland, Wales, Guernsey, Jersey, or the town of Berwick, to another port of the same, on pain of forfeiting such goods and vessel.

The 22 and 23 Car. II. c. 11. ordains, that where any goods shall be laden on board any english ship of the burden of two hundred tons, or upwards, and mounted with sixteen guns, or more, if the master yields up such ship or goods to any turkish vessel, or any pirate, without fighting, upon proof thereof in the admiralty, he shall be incapable of taking charge of any english vessel: and masters of english ships, though not of that burden, nor mounted as aforesaid, that shall yield without fighting to a turkish ship or pirate, that has not at least double the number of guns, shall be liable to the penalties of this act. If any inferior officers or mariners of a ship, shall refuse to fight when commanded, or utter words to discourage others, they shall lose all their wages due, and be imprisoned not exceeding six months; and mariners laying violent hands on their commanders, to hinder them from fighting in defence of their ships, shall suffer death as felons. When any english ship shall have been defended by fight, and brought to her port, in which fighting any of her men have been wounded or slain, the judge of the admiralty, or his surrogate, &c. where she shall arrive, upon the petition of the master and seamen, may call so many as

he shall be informed are the adventurers and owners, and by advising with them, levy upon the respective owners such sums as he himself, and the major part of them present, shall judge reasonable, not exceeding two *per cent.* of the ship and goods: which money shall be distributed among the master, officers and seamen, or the widows and children of the slain, according to the direction of the judge, with the approbation of three or more of the adventurers. By the 5th and 6th of Will. and Mary, c. 24. every person who shall build, or cause to be built, any ship of three decks, containing 450 tons, and mounted with thirty-two pieces of ordnance, having ammunition, &c. proportionable, shall for the first three voyages which the said ship shall make to any foreign parts, receive a tenth of the customs called the subsidy of tonnage and poundage, payable for merchandize exported and imported in such ships: but if after the end of the three first voyages, ships so built, shall be altered so as to become less defensible than they were at first, then they shall be forfeited and lost.

By 2 Ann. c. 9. owners of ships might navigate during the war with France, with masters and only one half of the mariners english: and by 3 and 4 Ann. c. 13. any ships might be navigated by foreign seamen; and foreigners serving on board any english ship for two years, were to be deemed natural-born subjects, &c.

By 4 Geo. I. c. 12. and 11 Geo. I. c. 29. if any officer or mariner belonging to any ship or vessel, shall wilfully cast away, burn or destroy the ship to which he belongeth, or in any-wise direct or procure the same to be done, with intent to prejudice a person that shall have granted any insurance thereon, or any merchant who shall load goods therein, or any owner of such vessel, the persons offending shall on conviction be adjudged guilty of felony without benefit of clergy.

The 5th of Geo. II. c. 20. enacts, that no commander of any ship outward-bound shall receive on board any gunpowder, either as merchandize or stores for the voyage, except for his majesty's service, before such ship shall be at Blackwall, in the river Thames; and all masters of ships coming into the river, shall put on shore all powder either before the arrival of their ships at the said place,

place, or within twenty-four hours after they come to anchor there, upon pain of forfeiting 5 l. for every 50 pounds weight of gunpowder on board, and in the like proportion for a less quantity. And no guns shall be kept loaded with shot in merchant-ships between London-bridge and Blackwall, or fired before the rising, or after the setting of the sun, under the penalty of 5 l. and for every gun so fired, 10 s. And if any pitch, tar, rosin, or other combustible matter shall be heated or melted by fire in any ships, every person so offending, shall, for every offence, forfeit 5 l. And ships are liable to be searched by an elder brother, appointed by the master, wardens, and assistants of the Trinity-house at Deptford. In case any ship shall be moored in the mouth or any other part of St. Saviour's dock, except such ships as shall be loading or delivering their cargoes, and others, not exceeding two at a time, that shall lie at shipwright-yard, at the north-west corner of the said dock, during the time they shall be repairing, the master of such ship shall forfeit 20 s. for every day she shall continue to be laid up and moored.

By 6 Geo. II. c. 29. masters of ships lying in the river Thames who have occasion for ballast, shall pay 1 s. per ton colliers, other ships 1 s. 3 d. and foreign ships 1 s. 7 d. per ton, to the corporation of the Trinity-house at Deptford; who shall pay ballast men 9 d. a ton, for railing and carrying it, &c. and it shall be lawful for any master of a ship to appoint two persons to go on board any lighter bringing ballast to such ship, to inspect the marks thereof; and every ballast-man shall immediately before the delivery of ballast to any ship, trim such lighter, so as to make it swim at equal marks at the stem and stern, and pump all the water out, &c. and the master, wardens, and assistants of the Trinity-house, are to make good to the master, the quantity or value of the ballast which shall be found deficient, or forfeit 50 l. one moiety to the poor, and the other to the person suing for it. The 7th of Geo. II. c. 15. ordains, that no owners of ships shall be liable to any loss by reason of embezzlement by the master or mariners, of any goods or merchandize shipped on board, or for any act done by them, without the privity or knowledge of such owners, further than the value of the ship, and amount of the freight during the voyage, in which 6 s. h embezzle-

ment of the master or mariners shall be committed: and if several persons shall suffer damage by the means aforesaid, and the value of the ship and cargo should not be sufficient to make compensation; then the freighters shall receive satisfaction in average, in proportion to their respective losses, to be ascertained on a bill in equity, exhibited for a discovery thereof, and of the value of such ship and freight. But nothing in this act shall discharge any remedy, which any person may have against the master and mariners, in respect of an imbezzlement. See the articles FREIGHT, INSURANCE, &c.

NAVAL STORES comprehend all those particulars made use of, not only in the royal navy, but in every other kind of navigation; as timber and iron for shipping, pitch, tar, hemp, cordage, sail-cloth, gun powder, ordnance, and fire-arms of every sort, ship-chandlery wares, &c. In order to encourage the importation of naval stores from Scotland and our own plantations, the following premiums have been granted for a certain time, and continued by several acts, from the third and fourth years of the reign of queen Anne, to the twenty-fourth of his late majesty's reign, viz.

| | | | |
|---|---|----|----|
| Hemp, water-rotted, bright and clean, from Scotland, or the british plantations in America, the ton | 1 | s. | d. |
| | 6 | 0 | 0 |

| | | | |
|--|---|---|---|
| Trees of twelve inches in diameter and upwards, fit for masts, yards, or bow-sprits, regularly converted, and turned at least into eight squares, sound and fresh, the ton, allowing 40 feet to each ton, girt-measure | 1 | 0 | 0 |
|--|---|---|---|

The following from the british plantations in America.

| | | | |
|---|---|---|---|
| Masts, yards, and bow-sprits, the ton, allowing 40 feet to the ton, | 1 | 0 | 0 |
|---|---|---|---|

| | | | |
|--|---|---|---|
| Clean merchantable tar, fit for making cordage, the ton, | 2 | 4 | 0 |
|--|---|---|---|

| | | | |
|---|---|---|---|
| Clean merchantable tar, prepared from green trees, by stripping off the bark, without cutting them down, fit for making cordage, per ton, | 4 | 0 | 0 |
|---|---|---|---|

| | | | |
|--------------------------------|---|---|---|
| Clean and good pitch, per ton, | 1 | 0 | 0 |
|--------------------------------|---|---|---|

| | | | |
|-------------------------------------|---|----|---|
| Clean and good turpentine, per ton, | 1 | 10 | 0 |
|-------------------------------------|---|----|---|

The last act which grants these bounties, was to continue in force till the year 1757.

Upon

Upon the landing of these stores, the refusal must be offered to the commissioners of the navy; and if, within twenty days after such tender, they shall not contract for them, the importers may otherwise dispose of them. No fee, gratuity, or reward, may be demanded or taken by the officers of the customs, for examining, viewing, or delivering any of the aforesaid naval stores; or for making or signing certificates, in order to receive the premium, upon forfeiture of office and 100 l. and being rendered incapable of serving his majesty. And if any of these naval stores, except hemp, shall be again exported, the exporter must, before entry thereof, produce to the collector, &c. of the customs, at the port of exportation, a receipt from the treasurer of the navy, or his cashier, subscribed by his comptroller, or his chief clerk, signifying that the full amount of the premium had been repaid to him: on failure whereof, such stores may not be exported; and if such stores are fraudulently exported without repayment of the premium, they are forfeited, with double the value.

NAVAL CROWN, *corona navalis*, in roman antiquity. See the article CROWN.

NAVARINO, a port-town of european Turkey, in the Morea, ninety miles south-west of Corinth.

NAVARRÉ, a province of Spain, bounded by french Navarre on the north-east, by Arragon on the south-east, by old Castile on the south-west, and by Guipuscoa on the west. It is a mountainous country.

French Navarre, separated from spanish Navarre on the south-west by the Pyrenees, is only thirty miles long and fifteen broad; being one of the most barren provinces in France.

NAVE, in architecture, the body of a church, where the people are disposed, reaching from the balluster, or rail of the choir, to the chief door.

Some derive the word nave from *naos*, a temple; and others, from *navis*, a ship, by reason the vault or roof of a church bears some resemblance to a ship.

NAVEL, *umbilicus*, in anatomy, the center of the lower part of the abdomen; being that part where the umbilical vessels passed out of the foetus to the placenta of the mother. See the articles ABDOMEN, FOETUS, &c.

The navel-string, or funiculus umbilica-

lis, of the foetus, besides its vein and two arteries, is composed of a spongy substance in which these vessels are lodged, which upon entering the placenta, are divided into numerous branches, and lesser ramifications.

As soon as the infant and after-burden are delivered, a firm ligature is made upon the navel-string, with a strong thread folded several times together, and about two or three fingers-breadth from the abdomen: this done, the navel-string leading to the placenta is to be cut off, and the wound dressed with lint, till the part on which the ligature was made, becoming dry, falls off of itself.

NAVEL-WORT, *cotyledon*, in botany. See the article COTYLEDON.

NAVEREINI, a town of Gascony, in France, sixteen miles south-east of Bayonne.

NAVEW, in botany. See the article RAPE SEED.

NAVICULARÉ os, in anatomy, a bone of the foot, lying between the astragalus and ossa cuneiformia, and so called from its resemblance to a boat. See the articles FOOT, ASTRAGALUS, &c.

It has a glenoid cavity, for its articulation with the head of the astragalus; and its anterior faces are received into the sinuses of the ossa cuneiformia.

NAVIDAD, a port-town of Mexico, in the province of Mechoachan: west long. 110°, and north lat. 19°.

NAUGRACUT, a city of the hither India, the capital of a province of the same name; east long. 78°, and north lat. 33°.

NAVIGATION, the art of conducting or carrying a ship from one port to another. See the article SHIP.

Navigation implies not only the mechanical art of managing the sails, and working a ship; that is, of causing it to observe such motions and directions, as are assigned by the navigator; which must be learned on ship-board, and in the practice of sailing: but likewise the theory thereof, which depends on the navigator's being before-hand furnished with the following elements.

1. A table of the latitudes and longitudes or the most remarkable parts of the sea-coasts, islands, rocks, shoals, &c. in the frequented parts of the world. See the articles LATITUDE and LONGITUDE.

2. Maps and charts of the seas and lands, together with the depths of water, and the times

times and setting of the tides upon the coast he may have occasion to approach near. See CHART, MAP, TIDES, &c.
3. The use and application of several instruments, necessary to point out the way the ship is to steer, to measure the rate she runs at, and to find the place she is in at any time. See the articles COMPASS, LOG, BACK-STAFF, FORE-STAFF, QUADRANT, &c.

4. A sufficient stock of mathematical learning, to enable him to make a right use of the observations that may be deduced from the preceding elements; but, particularly trigonometry. See the article TRIGONOMETRY.

Before we come to the particular methods of navigation, called plane-sailing, middle-latitude sailing, Mercator's sailing, &c. we shall explain what is meant by the terms course, distance, &c. Thus, let A (plate CLXXXVI. fig. 1. n^o 1.) be a place on the earth's surface, and A C its meridian; and suppose a ship to sail from A, on the N. E. rhumb, till she arrive at B: then the angle C A B, represents the course; A B the distance sailed; A C, the difference of latitude, in this case called northing; and C B, the departure. Hence it is plain, that the distance sailed will always be greater than either the difference of latitude or departure; it being the hypotenuse of a right-angled triangle, whereof the other two are the legs. But if a ship sails either due north or south, she sails on a meridian, makes no departure, and her distance and difference of latitude are the same. If a ship sails either due east or west, she runs on a parallel of latitude, makes no difference of latitude, and her departure and distance are the same. When the course is 45°, or 4 points, as in the above example, the difference of latitude and departure are equal. When the course is less than 45°, the difference of latitude is greater than the departure;

and, *vice versa*, when the course is greater than 45°.

When a figure relating to a ship's course is to be constructed, it must, first be considered, whether the ship is sailing northward or southward, and whether she goes to the eastward or westward of the place from which she departs. Thus, let the upper part of the paper, of whatever the figure is drawn on, always represent the north, then the lower part will be the south, the right hand side the east, and the left side the west; and the lines representing the difference of latitude, departure, and distance, are to be drawn and denominated accordingly.

Plain, or Plane-Sailing, is that method of navigating a ship, which supposes the earth to be an extended plane, as explained under the article CHART.

Case I. One latitude, course, and distance sailed, being given; to find the other latitude, and departure from the meridian.

Example: Suppose a ship in the latitude of 4° 10' N. sails S. S. W. 194 miles; required the latitude she is in, and how far she hath departed from her former meridian?

Geometrically: Let the place of the ship be O (plate XL. fig. 5.) draw the meridian O P, and the right line O Q, forming an angle with the meridian O P = 22° 30' = 2 points, the course steered; set off, on the line O Q, 194 miles, the distance sailed, from O to Q; from the point Q let fall the perpendicular Q P, on the meridian O P, and the triangle is constructed; and the lines O P and P Q, the difference of latitude and departure, may be measured by applying them to graduated lines on the chart, or to the same scale of equal parts which O Q was taken from.

Arithmetically: 1. For the difference of latitude, or side O P, the proportion will be;

| | |
|---|--------------|
| As radius = 90° | = 10.0000000 |
| To the distance sailed O Q = 194 | = 2.2878017 |
| So is the co-sine of the course = 67° 30' = angle Q | = 9.9656153 |
| To the difference of latitude O P = 179 | = 2.2534170 |
| 2. For the departure, or side P Q, the proportion is; | |
| As radius = 90° | = 10.0000000 |
| To the distance sailed O Q = 194 | = 2.2878017 |
| So is the sine of the course 22° 30' = angle O | = 9.6006997 |
| To P Q, the departure required = 77 | = 1.8885014 |

Case II.

Case II. Both latitudes and course being given, to find the distance and departure.
Example: Suppose a ship in the latitude $3^{\circ} 10'$ S. sails N. E. by N. till her difference of latitude be $2^{\circ} 20'$; required the distance sailed, and departure from the meridian?
Geometrically: Let R (*ibid.*) be the place the ship sailed from, on the chart; draw the meridian RS, setting off on it 140 miles = the difference of latitude, from R to S; and erecting the perpendi-

cular ST, draw the rhumb-line RT, making an angle with the meridian RS = $33^{\circ} 45'$ = the course steered, continuing it till it cut the perpendicular in T; then will T be the place of the ship on the chart; and the distance RT, and departure ST, may both be measured by applying them to the graduated lines, or the same scale RS was taken from.
Arithmetically: 1. To find the distance sailed, it will be;

| | | |
|--|---|------------|
| As the complement of the course = $56^{\circ} 15'$ = the angle T | = | 9.9198464 |
| To the difference of latitude = 140 = RS | = | 2.1461280 |
| So is radius = 90° | = | 10.0000000 |
| To the distance required = 168.4 = RT | = | 2.2262816 |

2. For the departure, the proportion will be;

| | | |
|---|---|------------|
| As radius = 90° | = | 10.0000000 |
| To the distance RT = 168.4 | = | 2.2262816 |
| So is the sine of the course, or angle R = $33^{\circ} 45'$ | = | 9.7447390 |
| To ST, the departure required = 93.5 | = | 1.9710206 |

Case III. Both latitudes and distance sailed being given, to find the course and departure.

Example: Admit a ship, in the latitude of 1° S. sails between the north and east 96 miles, till her difference of latitude be $1^{\circ} 10'$; required the course and departure?
Geometrically: Let V. (*ibid.*) be the place the ship sailed from, on the chart; draw the meridian VW, setting off on it 70, the difference of latitude, from V to W; and erecting the perpendi-

cular WX, take the distance sailed between the points of the compasses, and, setting one foot in V, with the other cross the perpendicular in X, which will be the place the ship is arrived at, on the chart; and the course or angle WVX, may be measured by the line of chords, and the departure WX, by applying it to the graduated lines on the chart, or to the same scale VX was taken from.
Arithmetically: 1. To find the course, or angle WVX, it will be;

| | | |
|---|---|------------|
| As VX, the distance sailed, = 96 | = | 1.9822712 |
| To radius 90° | = | 10.0000000 |
| So is VW, the difference of latitude = 70 | = | 1.8450980 |
| To the sine of the angle X, the complement of the course = $46^{\circ} 49'$ | = | 9.8628268 |

Which being taken from 90° , gives $43^{\circ} 11'$, the course steered; and because the course was between the north and east, it is N. $43^{\circ} 11'$ easterly, or nearly N. E. by N. three quarters easterly.

2. For the departure WX, the proportion will be;

| | | |
|---|---|------------|
| As radius = 90° | = | 10.0000000 |
| To the distance VX = 96 | = | 1.9822712 |
| So is the sine of the course, or angle V = $43^{\circ} 11'$ | = | 9.8352688 |
| To the departure WX = 65.7 | = | 1.8175400 |

Case IV. Both latitudes and departure being given, to find the course and distance.

Example: Suppose a ship, in the latitude 2° S. sails between the south and east, till her difference of latitude be $2^{\circ} 10'$, and her departure 96 miles east; required her direct course and distance?

Geometrically: Let a (*ibid.*) be the first place of the ship, on the chart; draw the meridian ab, setting off on it 130 miles,

the difference of latitude from a to b, and erect the perpendicular bc, making it = 96 miles, the departure from the meridian; through the points a and c, draw a right line, and the triangle is constructed; and the angle a, may be measured by the line of chords, and the distance ac, by applying it to the graduated lines on the chart.

Arithmetically: 1. To find the course, the proportion will be;

As $a b$ the difference of latitude $= 130$ $= 2.1139434$

To radius $= 90^\circ$ $= 10.0000000$

So is $b c$ the departure $= 96$ $= 1.9822712$

To the T. of the angle a , the course required, $= 36^\circ 27'$ $= 9.8683278$

Which, because she sailed between the south and east, is S. $36^\circ 27'$ easterly, or almost S. E. by S. one quarter easterly.

2. To find the distance sailed, the proportion will be ;

As the sine of the course, or angle $a = 36^\circ 27'$ $= 9.7738749$

To the departure $b c = 96$ $= 1.9822712$

So is radius $= 90^\circ$ $= 10.0000000$

To $a c$ the distance sailed $= 161.5$ $= 2.2083963$

Case V. One latitude, distance, and departure being given, to find the other latitude and course steered.

Example : A ship at sea, in the latitude of 1° N. sails between the north and east 120 miles, having departed to the eastward of her former meridian 96 miles; required her direct course, and the difference of latitude ?

Geometrically : Let d (*ibid.*) be the place of the ship; draw the meridian $d e$, and parallel to it, at the distance of the departure $= 96$, the line $f g$; take

As $d b$ the distance sailed $= 120$ $= 2.0791812$

To radius $= 90^\circ$ $= 10.0000000$

So is $e b$, the departure $= 96$ $= 1.9822712$

To the sine of the course, or angle $d = 53^\circ 7'$ $= 9.9030900$

That is, N. $53^\circ 7'$ easterly, or almost N. E. three quarters easterly.

2. For the difference of latitude the proportion will be ;

As radius $= 90^\circ$ $= 10.0000000$

To $d b$, the distance sailed $= 120$ $= 2.0791812$

So is the co-sine of the course $= 53^\circ 7'$ $= 9.7782870$

To $d e$, the difference of latitude $= 72$ $= 1.8574682$

Case VI. One latitude, course, and departure being given, to find the other latitude and distance sailed.

Example : Suppose a ship, in the latitude of $3^\circ 10'$ S. sails N. W. by N. till her departure be 90 miles; required her direct distance, and the latitude she is in ?

Geometrically : Let k (*ibid.*) be the first place of the ship; draw the meridian $k l$, and the rhumb line $k m$, forming an angle with the meridian $= 33^\circ 45'$, the

As the sine of the course, or $\angle k = 33^\circ 45'$ $= 9.7447390$

To the departure $l m = 90$ $= 1.9542425$

So is radius $= 90^\circ$ $= 10.0000000$

To the distance $k m = 162$ $= 2.2095035$

2. For the difference of latitude, the proportion will be ;

As the tangent of the course, or $\angle k = 33^\circ 45'$ $= 9.8208926$

To the departure $l m = 90$ $= 1.9542425$

So is the radius $= 90^\circ$ $= 10.0000000$

To $l k$ the difference of latitude $= 134.7$ $= 2.1293499$

the distance sailed between the points of the compasses, and, setting one foot in d , with the other cross the former parallel in b , which will be the place the ship is arrived at; from the point b , let fall the perpendicular $b e$, and draw the right line $d b$; then will $d e$ be the difference of latitude, and the angle d , the course; both which may be measured as in the former case.

Arithmetically : 1. To find the course, the proportion will be ;

course steered; at the distance of 90 miles, the departure, draw the line $n o$, parallel to $k l$; then will m be the place the ship is arrived at; from the point m , let fall the perpendicular $m l$; then will $k m$ be the distance, and $k l$, the difference of latitude; both which may be measured, by applying them to the graduated lines on the chart.

Arithmetically : 1. To find the distance sailed, the proportion will be ;

This method of sailing is extremely erroneous in high latitudes, and therefore is only fit to be used in the torrid zone. However, being very simple and easy to be understood, we have given the several cases of it first, that the young navigator may be accustomed to solve problems of this kind, both geometrically and by computation, before he applies himself to the following methods; in which we have contented ourselves to give the several cases, and proportions for solving them by means of logarithmic tables.

For the method of working traverses, or courses, see the article TRAVERSE.

Middle-Latitude Sailing, that method of navigation which is performed without meridional parts, by taking the middle-latitude; which method of sailing, tho' not strictly true, yet comes very near the truth, as will appear by comparing an example wrought by it, and by Mercator's sailing.

The method of taking the middle latitude of two places is this: find the sum of both their latitudes, and half that sum will be the middle latitude required. Thus, the middle latitude of two places, one in 50° , and the other in $17^{\circ} 10' N$. latitude, will be found to be $33^{\circ} 35'$; for $50^{\circ} + 17^{\circ} 10' = 67^{\circ} 10'$; and $\frac{67^{\circ} 10'}{2} = 33^{\circ} 35'$.

Case I. The latitudes of two places, and their difference of longitude, being given, to find the direct course and distance. First, find the departure, by this proportion; as the radius is to the co-sine of the middle parallel of latitude, so is the difference of longitude to the departure. Then for the course, it will be; as the difference of latitude is to the radius, so is the departure to the tangent of the course: and, lastly, for the distance, we have this proportion; as the radius is to the difference of latitude, so is the secant of the course to the distance.

Case II. One latitude, course, and distance sailed, being given to find the latitude and difference of longitude.

First, to find the difference of latitude, by case I. of Plane-Sailing, the proportion is; as the radius to the distance, so is the co-sine of the course to the difference of latitude: hence, the latitude come to being known, we have this analogy for finding the departure, *viz.* as the radius is to the distance, so is the sine of the course to the departure: and, lastly, for the difference of longitude, it will be,

by Case II. of Parallel-Sailing; as the co-sine of the middle parallel is to the radius, so is the departure to the minutes of difference of longitude.

Case III. Course and difference of latitude being given, to find the distance sailed, and difference of longitude.

First, for the departure, it will be, by Case II. of Plain-Sailing; as the radius is to the difference of latitude, so is the tangent of the course to the departure: then for the distance, by the same case; as the radius to the difference of latitude, so is the secant of the course to the distance: and, lastly, for the difference of longitude, the proportion is, by Case II. of Parallel-Sailing; as the co-sine of the middle parallel is to the departure, so is the radius to the minutes of difference of longitude.

Case IV. Difference of latitude and distance sailed being given, to find the course and difference of longitude.

First, for the course, by Case III. of Plain-Sailing, it will be; as the distance to the radius, so is the difference of latitude to the co-sine of the course: then for the departure, by the same case; as the radius to the distance, so is the sine of the course to the departure: and, lastly, for finding the difference of longitude, we have by Case II. of Parallel-Sailing, this proportion; as the co-sine of the middle parallel to the departure, so is the radius to the minutes of difference of longitude.

Case V. One latitude, course, and departure given, to find the difference of latitude, difference of longitude, and distance sailed. First, for the distance, by Case VI. of Plain-Sailing we have this analogy, *viz.* as the sine of the course to the departure, so is the radius to the distance: then for the difference of latitude, by the same case; as the tangent of the course to the departure, so is the radius to the difference of latitude: and, lastly, to find the longitude, by Case II. of Parallel-Sailing, we have this proportion, *viz.* as the co-sine of the middle parallel to the departure, so is the radius to the minutes of difference of longitude.

Case VI. Difference of latitude and departure given, to find the course, distance, and difference of longitude.

First, by Case IV. of Plain Sailing, we have this proportion for finding the course, *viz.* as the difference of latitude to the departure, so is the radius to the tangent of the course: and by the same case, for finding the distance; as the radius to the

difference of latitude, so is the secant of the course to the distance: and, lastly, by Case II. of Parallel-Sailing, we have this proportion for finding the difference of longitude, *viz.* as the co-sine of the middle parallel of latitude to the departure, so is the radius to the minutes of difference of longitude.

Case VII. Distance and departure given, to find difference of latitude, course, and difference of longitude.

First, by case V. of Plain-Sailing, we have this proportion for finding the course; as the distance to the radius, so is the departure to the sine of the course: and for the difference of latitude, by the same case; as the radius to the distance, so is the co-sine of the course to the difference of latitude: and, lastly, by Case II. of Parallel-Sailing, we have this proportion for finding the difference of longitude, *viz.* as the co-sine of the middle parallel to the departure, so is the radius to the minutes of difference of longitude.

Case VIII. Difference of longitude and departure given, to find the difference of latitude, course, and distance sailed.

First, by Case III. of Parallel-Sailing, we have this proportion for finding the latitude come to; as the minutes of difference of longitude to the departure, so is the radius to the co-sine of the middle parallel; now since the middle latitude is equal to half the sum of the two latitudes, it follows, that if from double the middle latitude we subtract any one of the latitudes, the remainder will be the other; whence the difference of latitude being found, we have this proportion for finding the course, by Case IV. of Plain-Sailing, *viz.* as the difference of latitude to the radius, so is the departure to the tangent of the course: and, lastly, by the same case, we have this analogy for finding the distance, *viz.* as the radius to the difference of latitude, so is the secant of the course to the distance.

Parallel-Sailing, is the art of finding what distance a ship should run due east or west, in sailing from the meridian of one place to that of another given place, in any parallel of latitude.

This method of navigation is generally used in conducting a ship to an island, detached from the main land or other islands. The method of performing it is this: they sail to the parallel of latitude the place is in, keeping a good account, so as to be certain whether the place is

then to the eastward or westward; and also, if possible, to know the longitude arrived at; and then they run due west or east, until the ship comes near the longitude of the given place, where she is then sure to make the port required.

The computations in parallel-sailing depend on the following proportions, *viz.*
1. As the radius, R , is to the co-sine of the latitude of any parallel, S ; so is the miles of longitude between any two meridians, L , to the distance, D , of those meridians in that parallel.

Demonstration. Let $P D F E$ (plate CLXXXVI, fig. 1. n^o 2.) represent the fourth part of a sphere, E being the center, P the pole, $E D$ the radius of the equator, $A B, a b$, the two radii of parallels; then are $P B D, P C d$, quadrants of meridians, $D d$ an arch of the equator intersected between them, and $B C, b c$, arches of parallels intercepted likewise between them; also the arches $D B, D b$, express the latitudes of these parallels, respectively; and $P B, P b$, the complements of these latitudes.

Now the circumference of a circle whose radius is $E D$, is to the circumference of a circle whose radius is $A B$, as $E D$ is to $A B$; that is, as the radius of the equator to the radius of the parallel, or as the radius to the co-sine of the latitude. But like arches, $D d, B C$, intercepted between the same two meridians, are in the same ratio of their circumferences; therefore, an arch of the equator $D d$, is to a like arch $B C$, in any parallel of latitude, as the radius to the co-sine of the latitude of that parallel. $Q. E. D.$

Hence it is easy to construct a table, shewing the proportional diminution of the degrees of longitude in every latitude, from the equator to the poles; which the reader will find under the article LONGITUDE.

2. As the co-sine of one latitude, S , is to the co-sine of another latitude, s ; so is a given meridional distance, in the first parallel D , to a corresponding meridional distance d , in the second parallel. This is evident.

And hence arises the following proportions, *viz.*

$$R : S :: L : D.$$

$$S : R :: D : L.$$

$$L : D :: R : S.$$

$$S : s :: D : d.$$

$$D : d :: S : s.$$

Whereby all the cases that can happen in this kind of sailing, are readily resolved by

by logarithms; as also by the table given under the article LONGITUDE.

Example: How far must a ship sail upon

As radius - - - - -
To the co. sine of the latitude - - - - -
So is 1° of longitude, or 60 miles - - - - -
To the distance to be sailed, or 51,96 miles

the parallel of 30° degrees latitude, in order to get one degree of longitude more westward?

$90^{\circ} = 10.0000000$
 $30^{\circ} = 9.9375306$
 $= 1.7781512$
 $= 1.7156818$

And the like for any other latitude: but this distance might have been found by only looking into the table given under the article LONGITUDE.

Mercator's sailing, that performed by Mercator's chart. See the article CHART.

Thus, let A and D (pl. CLXXXVI. fig. 1. n^o 3.) represent two places upon the surface of the earth; A C being the meridian of A, and A D the rhumb-line between the two places: thro' D draw D B, perpendicular to A C, and this will be the parallel of latitude of the place D: from A set off, upon the meridian, the length A C, equal to the meridional, or enlarged difference of latitude; and through C, draw C E, parallel to B D, and meeting A D, produced in E; then A B will be the proper difference of latitude, A C the enlarged difference of latitude, or the difference of latitude according to Mercator's chart, between the places A and D; C E will be the difference of longitude, and B D the departure; also A D will be the proper distance, A E the enlarged distance, or according to Mercator's chart, and the angle B A D, will be the course. See MERIDIONAL, LATITUDE, LONGITUDE, &c.

Now since in the triangle A C E, B D is parallel to one of its sides; it is plain the triangles A C E, A B D, will be similar, and consequently their sides proportional: and hence arise the solutions of the several cases in this sailing.

Case. I. To find the meridional or enlarged difference of latitude between two places, whose latitudes by observation are given.

Of this case there are three varieties: 1. When one of the places lies on the equator; then the meridional difference of latitude is the same with the latitude of the other place, taken from the table of meridional parts. 2. When the two places are on the same side of the equator; then the meridional difference is found, by subtracting the meridional parts, answering to the least latitude from those answering to the greatest, and the difference is that required. 3. When the places lie on different sides of the equa-

tor, then the meridional difference of latitude is found by adding together the meridional parts answering to each latitude, and the sum is that required.

Case II. To find the direct course and distance between two places, whose latitudes and longitudes are given.

First, for finding the course, we have the following proportion, by Case IV. of Rectangular Trigonometry, viz. as A C, the meridional difference of latitude, is to C E, the difference of longitude; so is R, the radius, to T. B A D, the tangent of the course. Then to find the distance, by Case II. of Rectangular Trigonometry, we have this proportion, viz. as the radius R, is to A B, the proper difference of latitude; so is secant \angle A, the secant of the course, to A D, the distance.

Case III. The course and distance sailed being given, to find the difference of latitude and difference of longitude.

First, for finding the difference of latitude by Case III. of Rectangular Trigonometry, we have this proportion, viz. as the radius is to the distance, so is the co-sine of the course to the proper difference of latitude: and hence, it will be easy to find the meridional difference of latitude; and to find the difference of longitude, the proportion is; as the radius to the meridional difference of latitude, so is the tangent of the course to the minutes of difference of longitude.

Case IV. Both latitudes, viz. that sailed from and come to, being given; to find the distance sailed, and the difference of longitude.

First, for the difference of longitude, the proportion will be; as the radius is to the enlarged or meridional difference of latitude, so is the tangent of the course to the minutes of difference of longitude. Then for the direct distance, the proportion is; as the radius to the proper difference of latitude, so is the secant of the course to the direct distance.

Case V. Both latitude and distance sailed being given, to find the direct course and difference of longitude.

First, for finding the angle of the course, the proportion is; as the proper difference of

of latitude is to the radius, so is the distance sailed to the secant of the course: then, for the difference of longitude, it will be; as the radius to the meridional difference of latitude, so is the tangent of the course to the minutes of difference of longitude.

Case VI. One latitude, course, and difference of longitude being given: to find the other latitude, and distance sailed.

First, say; as the tangent of the course is to the radius, so is the minutes of difference of longitude to the enlarged difference of latitude; whence, by Case I. the minutes of difference of latitude may be found: then to find the direct distance, say; as the radius is to the proper difference of latitude, so is the secant of the course to the direct distance.

Case VII. One latitude, course, and departure being given; to find the other latitude, distance sailed, and difference of longitude.

First for the distance, the proportion is; as the sine of the course is to the departure, so is the radius to the direct distance: then, for finding the proper difference of latitude, we have this analogy, *viz.* as the tangent of the course is to the departure, so is the radius to the proper difference of latitude: next, to find the difference of longitude, say; as the radius is to the meridional difference of latitude, so is the tangent of the course to the minutes of difference of longitude.

Case VIII. Both latitudes and departure being given, to find the course, distance, and difference of longitude.

First, for the difference of longitude, the proportion is; as the proper difference of latitude is to the departure, so is the enlarged difference of latitude to the minutes of difference of longitude: next, for the course, it will be; as the proper difference of latitude is to the departure, so is the radius to the tangent of the course; and, lastly, to find the distance, we have this analogy; as the sine of the course is to the departure, so is the radius to the direct distance.

Case IX. One latitude, distance sailed, and departure being given; to find the other latitude, difference of longitude, and course.

First, for the course, say; as the distance is to the radius, so is the departure to the sine of the course: next, for the difference of latitude, the proportion will be; as the radius to the distance, so is the co-

sine of the course to the difference of latitude; whence the meridional difference of latitude may be found: lastly, to find the difference of longitude, say, as the proper difference of latitude is to the departure, so is the enlarged or meridional difference of latitude to the minutes of difference of longitude.

From what has been said, it will be easy to solve a traverse, by Mercator's sailing. See TRIGONOMETRY and TRAVERSE.

Great-circle Sailing. See SAILING.

NAVIS, *argo navis*, or the ship Argo, in astronomy. See the article ARGO.

NAUMACHIA, in antiquity, a shew or spectacle among the antient Romans, representing a sea-fight.

NAUMBURG, a city of Germany, the capital of the county of Sax Naumburg, in Upper Saxony, situated in east long. 12° , north lat. $51^{\circ} 15'$.

NAUSEA, in medicine, a reaching, or propensity and endeavour to vomit, arising from a loathing of food, excited by some viscous humour that irritates the stomach.

In this disorder the patient is so far from desiring aliment, that he rather loaths it. It either proceeds from a fault in the stomach, or else is derived from other diseases, or is a symptom thereof, particularly acute inflammations, asthma, dropsy, hypochondriac passion, &c. or when the humours are corrupted, and the spirits suppressed, in malignant diseases. Vomiting in this case is proper, or purging when that is forbid. To these should be joined strengtheners of the stomach, and chiefly stomachic balsams, made of oil of nutmegs, and distilled oils, and stomachic plasters. Hoffman says, that there is nothing better than mint, its spirituous water, and distilled oil; likewise mastic and its spirit, or balsam of Peru distilled with salt of tartar. In acute fevers, especially the malignant, epidemic, and spotted, there is generally a nausea and reaching to vomit, for which reason emetics are good: likewise in the dysentery, especially when it is epidemic in a camp, emetics are not only useful, but necessary, with a slender diet. See EMETIC, FEVER, &c.

NAUTICAL PLANISPHERE, a description of the terrestrial globe upon a plane for the use of mariners, more usually called chart. See the article CHART.

NAUTICAL COMPASS, the same with mariners compass. See COMPASS.

NAUTICUS, in anatomy, is the name of

a muscle, called also *tibialis posticus*. See the article *TIBIALIS*.

NAUTILUS, in natural history, a simple shell, having no hinge, formed of one continued piece, rolled as it were into a spiral form, and having its cavity divided into a great number of cells by transverse partitions, each of which has a perforation, and is continuous to the others, by means of a syphunculus carried the whole length of the shell. The animal inhabiting this shell is a *sepia*.

Of the nautili, some are thick, and strong; others, thin, light, and brittle; some are aurated, others are not so; and some are smooth on the external surface, and others furrowed.

NAVY, the fleet or shipping of a prince or state. See the article *FLEET*.

The management of the british navy royal, under the lord high admiral of Great Britain, is entrusted to principal officers and commissioners of the navy, who hold their places by patent. The principal officers of the navy are four, *viz.* the treasurer, whose business it is to receive money out of the exchequer, and to pay all the charges of the navy, by warrant from the principal officers: comptroller, who attends and controls all payment of wages, is to know the rates of stores, to examine and audite all accounts, &c. surveyor, who is to know the states of all stores, and see wants supplied, to estimate repairs, charge boat-swains, &c. with what stores they receive, and at the end of each voyage to state and audite accounts: clerk of the acts, whose business it is to record all orders, contracts, bills, warrants, &c.

The commissioners of the navy are five: the first executes that part of the comptroller's duty which relates to the controlling the victuallers accounts; the second, another part of the said comptroller's duty, relating to the account of the store-keepers of the yard; the third has the direction of the navy at the port of Portsmouth; the fourth has the same, at Chatham; and the fifth, at Plymouth.

There are also other commissioners at large, the number more or less, according to the exigencies of public affairs; and since the increase of the royal navy, these have several clerks under them, with salaries allowed by the king.

The victualling of the royal navy hath formerly been undertaken by contract, but is now managed by commissioners, who hold their office on Tower-hill, London.

For the several yards belonging to his majesty's navy, see the article *YARD*.

The navy-office is where the whole business concerning the navy is managed, by the principal officers and commissioners.

The royal navy of Great Britain is now in a very flourishing state; having been diligently kept up in late reigns, as the natural strength of the kingdom. When it is complete, it is divided into three squadrons, distinguished by the different colours of the flags carried by the respective admirals belonging to the same. See *SQUADRON*, *FLAG*, and *ADMIRAL*.

For the regulation and government of the navy, divers laws have been enacted from time to time; thus, in order to the supplying the navy with men, an act was made, 7 & 8 Will. III. cap. 21. for the registering of seamen, to the number of thirty thousand, for the king's service; every seaman so registered, to be allowed 40 s. *per ann.* bounty-money, whether he was in the service or not, besides his pay for actual service; and it was provided that none but such registered mariners should be capable of preferment to any commission, &c. The persons so registered were exempted from serving on juries or in parish offices, as also from service abroad after they were fifty-five years of age; and when they were disabled for future service, they were to be admitted into Greenwich hospital: and the widows of seamen, killed or drowned, were to be taken into the said hospital, and their children educated, &c. See *HOSPITAL*. As a farther encouragement for entering into the king's service, it was enacted, 1 Geo. II. cap. 19. that if any seamen shall voluntarily enter his name with a commission officer belonging to the navy, to serve and appear on board a ship in fourteen days, &c. he shall have the usual conduct-money, and be paid two months advanced wages. When seamen die in the service, tickets shall be made out for their pay, which is to be paid immediately to the executors of the deceased. Bargains and assignments of seamen's pay are declared void; but their tickets for the same may be sold. Persons listed in the navy, shall not be taken thereout by any process at law, unless it be for some crime, or where the debt amounts to 20 l. &c.

NAXIA, or **NIXIA**, one of the islands of the Archipelago, about one hundred miles in circumference, situated in east longit. 26°, and north lat. 36° 30'.

NAZA-

NAZAREANS, in church-history, a name originally given to all christians in general, on account that Jesus Christ was of the city of Nazareth; but afterwards restrained to a sect of heretics, whose religion consisted of a strange jumble of judaism and christianity; observing at the same time the mosaical law, and the several rites of the christian religion.

NAZARITES, among the Jews, persons who either of themselves, or by their parents, were dedicated to the observation of nazariteship. They were of two sorts: namely, such as were bound to this observance for only a short time, as a week or month; or those who were bound to it all their lives. All that we find peculiar in the latter's way of life, is, that they were to abstain from wine and all intoxicating liquors, and never to shave or cut off the hairs of their heads. The first sort of nazarites were moreover to avoid all defilement; and if they chanced to contract any pollution before the term was expired, they were obliged to begin afresh. Women as well as men might bind themselves to this vow.

NE ADMITTAS, in law, a writ directed to the bishop, at the suit of one that is patron of a church, where, on a quare impedit, &c. depending, he is doubtful that the bishop will collate his clerk, or admit the other's clerk, during the suit between them. This writ should be brought within six months after the church becomes void, and upon granting it, another writ is issued to the chief justice of the common pleas, to certify the king in chancery, whether there be any plea before him and the other justices, between the parties, &c.

NEALED, among seamen, is used when the sounding is deep water close to the shore, as also when the shore is sandy, clayey, ousey, or foul and rocky ground.

NEALING, or rather **ANNEALING**. See the article **ANNEALING**.

NEAP TIDES. See the article **TIDES**.

NEAPED. When a ship wants water so that she cannot get out of the harbour, off the ground, or out of the dock, the seamen say she is neaped, or beneaped.

NEAR, or **NO NEAR**, at sea, a word of command from him that cons the ship to the man at the helm, requiring him to let her fall to the leeward.

NEAT, or **NET-WEIGHT**, the weight of a commodity alone, clear of the cask, bag, case, or even filth. See **WEIGHT**.

NEATH a, town of Glamorganshire, in

south Wales, situated on the river Neath, near the Bristol-channel, twenty-eight miles north-west of Landaff.

NEBEL, in jewish antiquity, the same with the psaltery. See **PSALTERY**.

NEBULOUS, **CLOUDY**, in astronomy, a term applied to certain of the fixed stars, which shew a dim hazy light; being less than those of the sixth magnitude, and therefore scarce visible to the naked eye.

NEBULY, or **NEBULE'E**, in heraldry, is when a coat is charged with several little figures, in form of words, running within one another, or when the outline of a bordure, ordinary, &c. is indented or waved, as represented in pl. CLXXXVI. fig. 6.

NECESSARIO, in music. This word is prefixed to certain parts in music, as a *dui violini necessario*, i. e. that must be played by two violins. *Canto necessario* is used to signify much the same as concertante. See **CONCERTANTE**.

Every mode has certain chords, which may be called its necessary or essential chords.

NECESSARY, in a philosophical sense, that which cannot but be, or cannot be otherwise. See the next article.

NECESSITY, whatever is done by a necessary cause, or a power that is irresistible, in which sense it stands opposed to freedom. See the article **FREEDOM**.

The schools distinguish a physical necessity, and a moral necessity; and a simply absolute necessity, and a relative one. Physical necessity is the want of a principle, or of a natural means necessary to act, which is otherwise called a physical or natural impotence. Moral necessity is only a great difficulty, such as that arising from a long habit, a strong inclination, or violent passion. Simple or absolute necessity is that which has no dependence on any state or conjuncture, or any particular situation of things, but is found every where, and in all the circumstances in which the agent can be supposed; such as in a blind man, the necessity he is under of not distinguishing colours. Relative necessity, is that which places a man in a real incapacity of acting or not acting in those circumstances, and that situation he is found in, tho' in other circumstances, and in another state of things, he might act or not act; such, in the opinion of the jansenists, is the necessity of doing evil, in a man who with a violent passion has only a feeble grace to resist it; or the necessity of

of doing well in a man who having grace of seven or eight degrees of strength, has only concupiscence of two or three degrees to withstand. All these kinds of necessity are opposite to freedom, or liberty; since even in the last it is as impossible for a man to act or not act, as if he were in a state of absolute and physical necessity.

The schoolmen admit of other species of necessity, antecedent, concomitant, consequent; &c. Antecedent necessity, is that arising from an antecedent cause necessarily operating; such is the necessity of the sun's rising to-morrow morning. Concomitant necessity arises from the antecedent and necessary cause, but depends upon the circumstances of the effect; the effect all the while being free: thus it is necessary Peter sit, supposing he is sitting.

NECK, *collum*, in anatomy, is that slender part situated between the head and the trunk of the body.

The neck consists of the following parts:

1. the common integuments: 2. seven vertebræ: 3. a number of muscles which serve to move the head, the neck, the larynx, the pharynx, and the os hyoides: 4. a number of very large arteries, as the carotids, internal and external, and the vertebral ones: 5. of large veins, as the jugular, internal and external, and the vertebral ones: 6. of large nerves, of the par vagum, the intercostals, the recurrent, the diaphragmatics, and the vertebral: 7. a part of the spinal marrow: 8. the aspera arteria, or trachea, particularly the larynx, in which is an eminence called the pomum adami: 9. the pharynx, with a part of the oesophagus: 10. the thyroide, with some other smaller glands. See the articles **LARYNX**, **PHARYNX**, **JUGULAR**, &c.

Wounds of the NECK. The treatment of these wounds ought to be different, according to the different nature of the wound. When the common integuments and muscular flesh only are wounded, it will require to be treated in the same manner as other slight wounds. See the article **WOUND**.

Where the external jugular is wounded, the methods used after bleeding in that vein will be sufficient. When the internal jugular vein is wounded, the hæmorrhage will be easily stopped by filling the wound with dry lint, or with the puff-ball or dusty mushroom; laying over these applications square bolsters,

and securing all with a bandage drawn as tight as the situation of the part will admit. Where this method has no effect, the surgeon should make a proper pressure on the wounded part with his finger, till the hæmorrhage is intirely stopped; the dressings applied are not to be removed for three days, and then a vulnerary balsam and plaster is to be applied to heal the wound. In large wounds, or an intire division of the internal jugular, the surgeon, if present, should make a firm pressure with his finger on the wounded part, and make incisions lengthways above the wound, till he can get at the vessel, and then make a firm ligature upon it, by the assistance of the crooked needle.

In case of a wound in the carotid artery, a surgeon, if present in time, should use the same method as in those of the internal jugular vein. This method is more likely to be attended with success in wounds of the upper and middle part of the vessel, than in those of the lower part of it; and where the wound is not in the trunk of the artery, but in one of its branches near the head, you should fill up the wound with lint dipt in some styptic liquor, and then cover it up with thick compresses, securing all with a tight bandage, and ordering an assistant to make a pressure upon the part with his hand, for some time after: and in these cases, the dressings are not to be removed till the third or fourth day.

In curing the wounds of the aspera arteria, the surgeon ought to clean the wound, and then endeavour to unite the parts by the help of sticking-plasters; or where the wound is large, by making two stitches with a crooked needle, dressing the wounds afterwards in the usual manner, and enjoining the patient to keep his head in a proper situation. The wound thus treated, will easily heal, if it has been made either by puncture, or a cutting instrument; but if it has been made by a bullet, and any part of the aspera arteria is carried away, the suture is to no purpose; wounds of this kind are only to be dressed with the vulnerary ballams. If the aspera arteria is intirely divided, and the lower end of it has shrunk into the cavity of the thorax, so that it cannot be laid hold on, and united to the upper part, there can be no remedy.

When the oesophagus is wounded, what is taken in at the mouth comes out through

the wound, and the patient is usually affected with hiccoughs and vomiting. When it is entirely divided, there is no remedy; but when it is only perforated, or wounded in part, the cure may be attempted by dressing it with the vulnerary balsams, endeavouring to unite it by means of sticking-plasters, and enjoining the patient a strict abstinence for some days, giving nourishing clysters of broth or milk; but when the necessities of nature require nourishment to be taken by the mouth, the wound should always be carefully cleaned afterwards, and dressed daily till it heals.

Wounds of the medulla spinalis are best dressed with balsam of peru, or medicines of the like nature, mixed with a small quantity of honey of roses, spread upon pledgits, and applied moderately warm. Slight ones of this kind are sometimes healed by this means, but large ones in this part bring on certain death.

Luxation of the NECK. If life remain after such an accident, the patient is to be immediately laid flat on the ground or floor; then the surgeon, laying hold of his head, is to extend it strongly, gently moving it from side to side, till he finds that the neck is restored to its natural posture. Mr. Petit mentions another method, by means of slings; but Heister gives the preference to the former method, both as being more simple, and because the patient can be relieved much sooner.

Wry NECK, a deformity usually brought into the world with people; but sometimes it is occasioned by accidents afterwards. When it is from the birth, there is very little reason to imagine it curable, because the vertebræ of the neck are rendered crooked by that posture, while the bones are in a soft and pliable state.

There are, however, in the writings of surgeons, some instances of this disorder, even in these circumstances, being cured after twelve, sixteen, or eighteen years.

When this disorder comes on adults, it is occasioned generally either by the contraction of the skin from a burn on one side, or from a strong spasmodic contraction of one of the mastoide muscles; which will at length become shorter and indurated, by continuing in that posture; or it may proceed from a relaxation of one or more of these muscles, in consequence of which the neck will be contracted by the stronger antagonist-muscle on the opposite side; or lastly, it may

proceed from a preternatural ligament drawing down the head. And when either of these is the occasion of the disorder, there is hopes of a cure; especially if the patient be young, and the disorder not of long standing.

If this disorder be recent, and caused by a defluxion of humours, evacuating medicines, with mild sudorifics, and heat, may be of service. But when it arises from a contraction of the skin or muscles by burning, the repeated use of oils, ointments, and fomentations, may relax so far as to make a cure. A proper firm bandage must be applied to pull the head toward the natural posture, and a steel-collar may be contrived, by which the patient will be suspended very frequently till the neck recover its proper position. But when all these fail, the manual assistance of the surgeon is to be called in. If the skin is contracted by a burn, it must be carefully incised transversely in several places, and the incisions dressed so as to keep them open and dilated, and the head pulled to its proper position by a bandage, till the new flesh filling up these incisions, gives room for the head to stand even. But if the wry-neck proceeds from a contraction of one of the mastoide muscles, or from some ligament, they are to be divided by a transverse incision in their lower part, near the clavicle or sternum.

NECKAR, a river of Germany, which rises in the south part of the circle of Swabia, and falls into the Rhine at Manheim.

NECROMANCY, a species of divination, performed by raising the dead, and extorting answers from them. See the article *DIVINATION*.

NECROSIS, in medicine, a term sometimes used for a mortification, or sphacelus. See the article *SPHACELUS*.

NECTAR, *νεκταρ*, among antient poets, the drink of the fabulous deities of the heathens, in contradistinction from their solid food, which was called ambrosia. See the article *AMBROSIA*.

This word is also used by some of the antients to express honey.

NECTARINE, a fruit differing nothing from the common peach, of which it is a species, than in having a smoother rind and a firmer pulp. See *PERSICA*.

NECTARIUM, among botanists, expresses what is sometimes only a part of the corolla, and sometimes, though more rarely, the whole: it is a part destined for

for the reception of the honey-juice of the plant, and is very various in its figure; being sometimes only a hollow in a petal, sometimes a little squama or tubercle, and sometimes a plain tube.

NECYDALIS, in zoology, a genus of the coleoptera class of insects, the antennæ of which are setaceous; the exterior wings are dimidiated, and there are interior or membranaceous ones.

NEEDHAM, a market town of Suffolk, situated on the river Orwel, eight miles north-west of Ipswich.

NEEDLE, *acus*, a very common little instrument or utensil, made of steel, pointed at one end, and pierced at the other, used in sewing, embroidery, tapestry, &c. Needles make a very considerable article in commerce, though there is scarce any commodity cheaper, the consumption of them being almost incredible. The sizes are from n^o 1. the largest, to n^o 25. the smallest. In the manufacture of needles, german and hungarian steel are of most repute. In the making them, the first thing is to pass the steel thro' a coal-fire, and, under a hammer, to bring it out of its square figure into a cylindrical one. This done, it is drawn through a large hole of a wire-drawing-iron, and returned into the fire, and drawn through a second hole of the iron, smaller than the first, and thus successively, from hole to hole, till it has acquired the degree of fineness required for that species of needles, observing every time it is to be drawn that it be greased over with lard, to render it more manageable. The steel thus reduced to a fine wire, is cut in pieces of the length of the needles intended. These pieces are flatted at one end on the anvil, in order to form the head and eye: they are then put into the fire to soften them farther, and thence taken out and pierced at each extreme of the flat part on the anvil, by force of a puncheon of well-tempered steel, and laid on a leaden block to bring out, with another puncheon, the little piece of steel remaining in the eye. The corners are then filed off the square of the heads, and a little cavity filed on each side of the flat of the head: this done, the point is formed with a file, and the whole filed over: they are then laid to heat red hot on a long flat narrow iron, crooked at one end, in a charcoal fire, and when taken out hence, are thrown into a basin of cold water to harden. On this operation a good deal depends: too much heat burns

them, and too little leaves them soft: the medium is learned by experience. When they are thus hardened, they are laid in an iron-shovel on a fire, more or less brisk in proportion to the thickness of the needles; taking care to move them from time to time. This serves to temper them, and take off their brittleness: great care here too must be taken of the degree of heat. They are then straitened one after another with the hammer, the coldness of the water used in hardening them having twisted the greatest part of them. The next process is the polishing them. To do this they take twelve or fifteen thousand needles, and range them in little heaps against each other on a piece of new buckram sprinkled with emery-dust. The needles thus disposed, emery-dust is thrown over them, which is again sprinkled with oil of olives; at last the whole is made up into a roll, well bound at both ends. This roll is then laid on a polishing-table, and over it a thick plank laden with stones, which two men work backwards and forwards a day and a half, or two days, successively; by which means the roll thus continually agitated by the weight and motion of the plank over it, the needles within being rubbed against each other with oil and emery, are insensibly polished. After polishing they are taken out, and the filth washed off them with hot water and soap: they are then wiped in hot bran, a little moistened, placed with the needles in a round box, suspended in the air by a cord, which is kept stirring till the bran and needles be dry. The needles thus wiped in two or three different brans, are taken out and put in wooden vessels, to have the good separated from those whose points or eyes have been broke either in polishing or wiping: the points are then all turned the same way, and smoothed with an emery-stone turned with a wheel. This operation finishes them, and there remains nothing but to make them into packets of two hundred and fifty each.

Needles the dozen thousand pay, on importation, 11s. 6⁶⁰/₁₀₀d. and, on exportation, draw back 10s. 1⁵⁰/₁₀₀d. Pack-needles the thousand pay, on importation, 2s. 6⁸⁰/₁₀₀d. and draw back, on exportation, 2s. 3d. Sail-needles the thousand pay, on importation, 1s. 3⁴⁰/₁₀₀d. and draw back, on exportation, 1s. 1⁰⁰/₁₀₀d.

Chirurgeon's NEEDLE. There are many cases wherein the use of the needle is

highly necessary; in some of which a cure cannot be completed without it, as in wounds of the belly, and in divided tendons. In amputations they are found much preferable to the actual cautery; and in the operation of the aneurism, bubonocoele, lithotomy, &c. they very much forward the cure; and in a cataract and hare-lip, the cure is wholly performed by them; for a description of the different needles used in the cure of each of these two last disorders, see the articles **COUCHING** and **HARE-LIP**.

Chirurgical needles are of different figures and sizes; being straight, crooked and flat; and all of them very sharp, and mostly made of well-tempered metal: those needles used for setons, and generally for the suture of tendons, and for the sewing up of dead bodies, must be straight. In amputation, and all other sort of wounds, the crooked sort are used. Mr. Monro, in the Medical Essays, observes, that needles of silver pierce more easily in stitching arteries after amputation, than those made of steel. See the article **LITHOTOMY**.

Magnetical NEEDLE, in navigation, a needle touched with a loadstone, and sustained on a pivot or center; on which playing at liberty, it directs itself to certain points in or under the horizon; whence the magnetical needle is of two kinds, *viz.* horizontal and inclinatory. See the article **MAGNET**.

Horizontal needles are those equally balanced on each side the pivot that sustains them; and which, playing horizontally with their two extremes, point out the north and south points of the horizon. For their application and use, see the article **COMPASS**.

In the construction of the horizontal needle a piece of pure steel is provided, of a length not exceeding six inches; lest its weight impede its volubility; very thin, to take its verticity the better, and not pierced with any holes, or the like, for ornament sake, which prevent the equable diffusion of the magnetic virtue. A perforation is then made in the middle of its length, and a brass-cap or head soldered on, whose inner cavity is conical, so as to play freely on a style or pivot headed with a fine steel-point. The north point of the needle in our hemisphere is made a little lighter than the southern; the touch always destroying the balance, if well adjusted before, and rendering the north end heavier than the

south, and thus occasioning the needle to dip.

The method of giving the needle its verticity or directive faculty, has been shewn already under the article **MAGNET**; but if after touching, the needle be out of its equilibrium, something must be filed off from the heavier side, till it balance evenly.

Needles in sea-compasses are usually made of a rhomboidal or oblong form: we have given their structure already under the article **COMPASS**.

The needle is not found to point precisely to the north except in very few places, but deviates from it more or less in different places, and that too at different times, which deviation is called its declination or variation from the meridian. See the article **VARIATION**.

Inclinatory or dipping-needle, a magnetical needle so hung as that instead of playing horizontally and pointing out north and south, one end dips or inclines to the horizon, and the other points to a certain degree of elevation above it. Or a dipping-needle may be defined, with Mr. Whiston, to be a long straight piece of steel (plate **CLXXXVI.** fig. 2.) every way poised on its center, and afterwards touched with a loadstone, but so contrived as not to play on the point of a pin, as does the common horizontal needle, but to swing in a vertical plane, about an axis parallel to the horizon; and this to discover the exact tendency of the power of magnetism.

The inventor of the dipping-needle, Mr. Whiston observes, was without all question one Robert Norman, a compass-maker at Wapping in London; who having had a custom of finishing and hanging the needles of his compasses before he touched them, always found that immediately after the touch, the north point would bend or decline downward under the horizon, insomuch that to balance the needle again, he was always forced to put a piece of wax on the south end, as a counterpoise. The constancy of this effect led him at length to observe the precise quantity of the dip, or to measure the greatest angle the needle would make with the horizon. This, in the year 1576, he found at London to be $71^{\circ} 50'$; but the dip varies as well as the horizontal direction, and is now found at the same place to be about 75° . Burrows, Gilbert, Ridley, Band, &c. endeavour to apply this discovery of the dip to the finding

finding of the latitude; and the last author going further, likewise proposed the finding of the longitude thereby, but for want of observations and experiments, he could go no length. The late Mr. Whiston being furnished with the further observations of colonel Windham, Dr. Halley, Mr. Pound, Mr. Cunningham, Pere Noel, Pere Feuillée, and his own, improved very much upon this doctrine and use of the dipping-needle, brought it into more certain rules, and endeavoured in good earnest to find the longitude thereby. In order to this he observes,

1. That the true tendency of the north or south end of every magnetic needle is not to that point in the horizon to which the horizontal needle points, but towards another directly under it in the same vertical; and in different degrees under it in different ages, and in different places.
2. That the power by which a horizontal needle is governed, and all our navigation ordinarily directed, is proved to be but one quarter of the power by which the dipping-needle is moved, which should render the latter far the more effectual and accurate instrument.
3. That a dipping-needle a foot long, will plainly shew an alteration of the angle of inclination in those parts of the world in half a quarter of a degree, or $7\frac{1}{2}$ geographical miles: *i. e.* supposing that distance taken along or near a meridian. And a needle of four feet, in two or three miles.
4. A dipping-needle four feet long in these parts of the world, will shew an equal alteration along a parallel, as one of a foot long will shew along a meridian: *i. e.* this will with equal exactness shew the longitude, as that the latitude. This depends on the position of the lines of equal dip in these parts of the world, which are found to be about fourteen or fifteen degrees from the parallels. Hence he argues, that as we can have needles of five, six, seven, eight or more feet long, which will move with strength sufficient for exact observation, and since microscopes may be applied to the viewing the smallest divisions of degrees on the limb of the instrument, it is evident that the longitude at land may be found thereby to less than four miles; and as there has been many observations made at sea with the same instrument by Noel, Feuillée, &c. which have determined the dip usually within a degree, sometimes within $\frac{1}{2}$ or $\frac{1}{3}$ of a degree, and this with small needles of five or six or at the most nine

inches long, it is evident the longitude may be found even at sea to less than half a quarter of a degree. This much premised, the observation itself follows.

To find the longitude or latitude by the dipping-needle. If the lines of equal dip below the horizon be drawn on maps or sea-charts from good observations, it will be easy from the longitude known, to find the latitude, and from the latitude known, to find the longitude either at sea or land.

Suppose, for example, you were travelling or sailing along the meridian of London, and found the angle of dip with a needle of one foot to be 75° , the chart will shew that this meridian and the line of dip meet in the latitude $53^\circ 11'$, which therefore is the latitude sought. See the article LATITUDE.

Or suppose you were travelling or sailing along the parallel of London, that is in $51^\circ 32'$ north latitude, and you find the angle of dip to be 74° . The parallel and the line of this dip will meet in the map in $1^\circ 46'$ of east longitude from London, which is therefore the longitude sought. See the article LONGITUDE.

About the year 1700, Dr. Halley published a sea-chart, on which the lines of variation are delineated: but as experience has shewn, that the variation is in a perpetual state of fluctuation, at least in the greatest part of the world, it is therefore necessary that the lines of variation be often corrected. About the year 1744, Mr. Montaine and Mr. Dodson found, on a careful examination, that the variation lines constructed by Dr. Halley were become entirely useless; and that, in order to render this chart useful to the mariner, it was necessary to construct a new system of these lines, or something analogous to them every ten or twelve years at least; accordingly, about the year 1744, they republished Dr. Halley's chart with new variation lines. In 1755, they made a new construction; those of 1744 being become erroneous by time; and in 1759, they published an account of the methods used to describe lines on Dr. Halley's chart, shewing the variation of the magnetic needle, about the year 1756, in all the known seas, and the application and use of these lines in correcting the longitude at sea.

As the mutation of the magnetical variation is remarkably irregular in different parts of the world, the only method of constructing a variation chart, is by collecting

lecting a large number of observations made by artists in their voyages, and transferring them to the chart, which was the method these gentlemen pursued.

In 1755, was published a table of the quantity of variation, from the year 1660 to 1860; at several places, computed, after many years intense application, by Mr. Williams, who was persuaded he had discovered a method of calculating the variation at any given place and time.

NEEDLE-FISH, a species of syngnathus, with the middle of the body hexangular; and the tail pinnated. See the article SYNGNATHUS.

The males and females of this species, as well as of the sea-adder, another species of the syngnathus, are easily distinguished; the females carrying a kind of long bag, reaching from the anus half-way to the tail; there are numerous eggs in this, at the proper season they are full, of the size of rape-seed, and of a whitish colour; they neither are so numerous, nor at all resemble in their arrangement or disposition the eggs of the generality of the other fishes of this class; this may indeed be in some degree said to be viviparous, for the rudiment of the foetus is in some measure animated before it is discharged from the vesica or bag.

NEEDLE-SHELL, in natural history, the slender turbo, with ventricose spires, and a small round mouth. See TURBO.

NEEDLES, two capes, or head-lands, at the west end of the isle of Wight, which is very difficult to pass on account of the sands and rocks.

NE EXEAT REGNUM, or more properly, **NE EXEAT REGNO**, in law, a writ for restraining a person from going out of the kingdom, without the king's licence. It may be directed either to the sheriff, to cause the party to find surety that he will not depart the realm, or to the party himself; and in that case, if he goes, he is liable to be fined. If a suit be depending in the court of chancery, and the plaintiff is afraid that the defendant will fly abroad, he may have this writ; in which the defendant must give bond to the master of the Rolls, in the penalty of 1000 l. or some such sum, for submitting to the writ, or else he must satisfy the court, by answer, affidavit, or otherwise, that he has no design of leaving the kingdom, and enter into security accordingly.

NEFASTI DIES, in roman antiquity, an appellation given to such days wherein it was not allowed to administer justice, usually marked in the calender by N. or N. P. *i. e.* nefastus prima, when only nefastus for the first part of it. See FASTI.

NEGAPATAN, a port-town of the hither India, situated on the coast of Coromandel: east long. 79°; north lat. 11° 15'.

NEGATION, in logic, an act of the mind, affirming one thing to be different from another; as, that the soul is not matter.

NEGATIVE, in general, something that implies a negation: thus we say, negative quantities, negative signs, negative powers, &c. See the articles QUANTITY, SIGN, POWER, &c.

Our words and ideas, says Dr. Watts, are so unhappily linked together, that we can never know which are positive, which negative ideas, by the words that express them: for some positive terms denote a negative idea, as dead; and there are both positive and negative terms invented to signify the same and contrary ideas, as unhappy and miserable. To this may also be added, that some words, which are negative in the original language, seem positive in english, as *abyss*. The way therefore to know whether any idea be negative or not, is to consider whether it primarily implies the absence of any positive being, or mode of being; if so, then it is a negative idea, otherwise a positive one.

According to logicians, the only way to prove a negative, is by converting it into an affirmative.

NEGATIVE PREGNANT, a negative that implies or brings forth an affirmative; as where a person is impleaded to have done a certain thing on such a day, &c. and denies the thing generally, without alleging any thing farther; it is a negative pregnant plea, because such pleading may nevertheless imply that he did it in some sort.

NEGOMBO, a port-town on the west coast of the isle of Ceylon, in the indian ocean, subject to the Dutch: east long. 78°, north lat. 7° 25'.

NEGRAIS, a port-town of Pegu, in the further India, situated on the west side of the bay of Bengal: east long. 92° 30', north lat. 17°.

NEGRIL POINT, the most westerly promontory of the island of Jamaica.

NEGROES, properly the inhabitants of Nigriia

Nigritia in Africa, also called blacks and moors; but this name is now given to all the blacks.

The origin of the negroes, and the cause of this remarkable difference from the rest of the human species, has much perplexed the naturalists: Mr. Boyle has observed, that it cannot be produced by the heat of the climate: for though the heat of the sun may darken the colour of the skin, yet experience does not shew that it is sufficient to produce a true blackness, like that of the negroes.

In Africa itself, many nations of Æthiopia are not black, nor were there any blacks originally in the West-Indies. In many parts of Asia, under the same parallel with the african region, inhabited by blacks, the people are but tawney. He adds, that there are negroes in Africa beyond the southern tropic, and that a river sometimes parts nations, one of which is black and the other only tawney. Dr. Barriere alledges, that the gall of negroes is black, and being mixed with their blood, is deposited between their skin and scarf-skin. However, Dr. Mitchel, of Virginia, in the Philosophical Transactions, n^o 476, has endeavoured by many learned arguments to prove, that the influence of the sun in hot countries, and the manner of life of their inhabitants, are the remote causes of the colour of negroes, indians, &c. and indeed it would be a strong confirmation of his doctrine, if we could see any people, originally white, become black and woolly by transplantation, or *vice versa*.

Negroes are brought from Guinea, and other coasts of Africa, and sent into the colonies in America, to cultivate tobacco, sugar, indigo, &c. and in Mexico and Peru, to dig in the mines; and this commerce, which is scarce defensible on the foot either of religion or humanity, is now carried on by all the nations that have settlements in the West-Indies. Those negroes make the best slaves, who are brought from Angola, Senegal, Cape Verd, the river Gambia, the kingdoms of Joloffes, Daniel, Galland, &c.

There are various ways of procuring them: some, to avoid famine, sell themselves, their wives and children, to their princes, or other great men: others are made prisoners of war; and great numbers are seized in excursions made for that very purpose by the petty princes, upon one another's territories, in which

it is usual to sweep away all, without distinction of age or sex.

NEGRO-CAPE, a promontory of Angola, on the west coast of Africa: east long. 14°, south lat. 17°.

NEGROES-ISLAND, one of the Philippine Islands, in the Indian Ocean, subject to Spain; so called, because most of the inhabitants are blacks: east long. 120°, north lat. 10°.

NEGROLAND, or NIGRITIA, a country of Africa, which lies between 18° west, and 15° east longitude, and between 10° and 20° of north latitude, the great river Niger running through it. It is bounded by Zaara, or the desert, on the north; by unknown countries on the east; by Guinea, on the south; and by the Atlantic Ocean on the west.

NEGROPONT, or EGRIPPO's, the capital of the island of Negropont, antiently called Euboea, situated in the Archipelago, on the west side of the island; where the strait is so narrow, that it is joined to the continent by a bridge: east long. 24° 30', north lat. 38° 30'.

NEHEMIAH, a canonical book of the Old Testament, so called from the name of its author. Nehemiah was born at Babylon, during the captivity, and succeeded Ezra in the government of Judah and Jerusalem. He was a Jew, and was promoted to the office of cup-bearer to Artaxerxes Longimanus, king of Persia; when the opportunities he had of being daily in the king's presence, together with the favour of Esther the queen, procured him the favour of being authorized to repair and fortify the city of Jerusalem, in the same manner as it was before its destruction by the Babylonians. On his going to Jerusalem, he finished the rebuilding of the walls in fifty-two days, and dedicated the gates of the city with great solemnity. He then reformed some abuses which had crept in among his countrymen, particularly the extortion of the usurers, by which the poor were so oppressed as to be forced to sell their lands and children for support: after which he returned to Persia, and came back again with a new commission, by virtue of which he regulated every thing relating both to the state and religion of the Jews. The history of these transactions is the subject of this book.

NEIF, *nativa*, in law-books, denotes a she-villain. See the article VILLAIN.

NE INJUSTE VEXES, in law, a writ that lies for a tenant, who is distrained by his

his lord for more services than he is obliged to perform; being a prohibition to the lord, not to distrain, or vex, his tenant.

NEISSE, a town of Silesia, situated on a river of the same name, forty-three miles south of Breslaw.

NEIVA, a river of Muscovy, on which the capital city of Petersburg stands, which falls into the gulph of Finland.

NELLENBURG, a city of Swabia, in Germany, capital of a county of the same name, situated fifteen miles north of Constance.

NELSON'S FORT, a fort and settlement on the west side of Hudson's Bay: west long. 91° , north lat. 57° .

NEMÆA, a town in the Morea, thirty miles south of Corinth, where the antient nemæan games were celebrated.

NEMÆAN GAMES, were so called from Nemæa, a village between the cities of Cleonæ and Philus, where they were celebrated every third year. The exercises were chariot-races, and all the parts of the pentathlon. These games were instituted in memory of Opheltes, or Archemorus, the son of Euphetes and Creusa, and nursed by Hypsipyle; who leaving him in a meadow, while she went to shew the besiegers of Thebes a fountain, at her return found him dead, and a serpent twined about his neck; whence the fountain, before called Langia, was named Archemorus; and the captains, to comfort Hypsipyle, instituted these games. Others ascribe their institution to Hercules, after his victory over the nemæan lion.

NEMINE CONTRADICENTE, *none contradicting it*, a term chiefly used in parliament when any thing is carried without opposition.

NEMOURS, a city in the isle of France, forty-two miles south of Paris: east long. $2^{\circ} 45'$, north lat. $48^{\circ} 17'$.

NENIA, or **NÆNIA**, in antient poetry, a mournful kind of song, filled with the praises of some deceased person, and sung during the celebration of the funeral. See the article **FUNERAL**.

NEOMENIA, or **NOUMENIA**, a festival of the antient Greeks, at the beginning of every lunar month, which was, as the name imports, observed upon the day of the new moon, in honour of all the gods, but especially Apollo, who was called Neomenios; because the sun is the fountain of light, and whatever distinction

of times and seasons may be taken from other planets, yet they are all owing to him as the original of those borrowed rays by which they shine.

The games and public entertainments at these festivals, were made by the rich, to whose tables the poor flocked in great numbers. The Athenians at these times offered solemn prayers and sacrifices for the prosperity of their country during the ensuing month. See the article **GAMES**. The Jews had also their neomenia, or feast of the new moon, on which peculiar sacrifices were appointed, and on this day they had a sort of family entertainment and rejoicing. The most celebrated neomenia of all others was that at the beginning of the civil year, or first day of the month Tisri, on which no servile labour was performed: they then offered particular burnt-sacrifices, and sounded the trumpets of the temple. The modern jews keep the neomenia only as a feast of devotion, which any one may observe or not as he pleases.

NEOPHYTES, new plants, a name given by the antient Christians to those heathens who had newly embraced the faith; such persons being considered as regenerated, or born anew by baptism. The term neophytes has been also used for new priests, or those just admitted into orders, and sometimes for the novices in monasteries. It is still applied to the converts made by the missionaries among the Infidels.

NEOTTIA, **BIRD'S NEST**, in botany, a genus of the gynandria diandria class of plants, the flower of which consists of five ovato-oblong petals, connivent at the points: the nectarium is undivided, equal in length to the petals, and furnished with a denticulation on each side; the fruit is a rugose, oblong, capsule, containing a great number of seeds.

NEPA, the lesser furz, in botany, a species of genista spartium.

NEPA, the **WATER SCORPION**, in zoology, a genus of four winged insects, the rostrum whereof is inflected; the antehæ formed into a kind of claws; the wings cruciated; and the legs four in number. This is a large insect, near an inch in length, and about half its length in breadth; its body is of a kind of elliptic form, very flat and thin, and its tail long and pointed; the body is composed of several joints, and the anus is remarkably large.

NEPEN.

NEPENTHES, in botany, a plant of the gynandria-tetrandria class, without any flower petals: the fruit is an oblong, columnar, truncated capsule, containing numerous seeds.

NEPENTHES, *ινπειθης*, is also a medicine, mentioned by Homer, as most efficacious against grief and sorrow: he says, that whoever should take it mixed with wine, could not be sensible of grief for that whole day, though his father or mother were to die.

NEPER'S RODS, or **BONES**, an instrument invented by J. Neper, baron of Merchiston, in Scotland, whereby the multiplication and division of large numbers are much facilitated.

As to the construction of NEPER'S RODS: suppose the common table of multiplication to be made upon a plate of metal, ivory, or paste-board, and then conceive the several columns (standing downwards from the digits on the head) to be cut asunder; and these are what we call Neper's rods for multiplication. But then there must be a good number of each; for as many times as any figure is in the multiplicand, so many rods of that species (*i. e.* with that figure on the top of it) must we have; though six rods of each species will be sufficient for any example in common affairs: there must also be as many rods of 0's.

But before we explain the way of using these rods, there is another thing to be known, *viz.* that the figures on every rod are written in an order different from that in the table. Thus, the little square space or division in which the several products of every column are written, is divided into two parts by a line across from the upper angle on the right to the lower on the left; and if the product is a digit, it is set in the lower division; if it has two places, the first is set in the lower, and the second in the upper division; but the spaces on the top are not divided: also there is a rod of digits, not divided, which is called the index rod, and of this we need but one single rod. See the figure of all the different rods, and the index, separate from one another, in plate CLXXXVI. fig. 3. n^o 1.

Multiplication by NEPER'S RODS: first lay down the index rod; then on the right of it set a rod, whose top is the figure in the highest place of the multiplicand: next to this again, set the rod, whose top is the next figure of the multiplicand;

and so on in order, to the first figure. Then is your multiplicand tabulated for all the nine digits; for in the same line of squares standing against every figure of the index rod, you have the product of that figure, and therefore you have no more to do but to transfer the products and sum them. But in taking out these products from the rods, the order in which the figures stand obliges you to a very easy and small addition: thus, begin to take out the figure in the lower part, or unit's place, of the square of the first rod on the right: add the figure in the upper part of this rod to that in the lower part of the next, and so on, which may be done as fast as you can look on them. To make this practice as clear as possible, take the following example.

Example: To multiply 4768 by 185. Having set the rods together for the number 4768 (*ibid.* n^o 2.) against 5 in the index, I find this number, by adding according to the rule.

| | |
|-------------------------|---------|
| | 23840 |
| Against 8, this number. | 38144 |
| Against 3, this number. | 14304 |
| Total product. | 8835680 |

To make the use of the rods yet more regular and easy, they are kept in a flat square box, whose breadth is that of ten rods, and the length that of one rod, as thick as to hold six (or as many as you please) the capacity of the box being divided into ten cells, for the different species of rods. When the rods are put up in the box (each species in its own cell distinguished by the first figure of the rod set before it on the face of the box near the top) as much of every rod stands without the box as shews the first figure of that rod: also upon one of the flat sides without and near the edge, upon the left hand, the index rod is fixed: and along the foot there is a small ledge, so that the rods when applied are laid upon this side, and supported by the ledge, which makes the practice very easy; but in case the multiplicand should have more than 9 places, that upper face of the box may be made broader. Some make the rods with four different faces, and figures on each for different purposes.

Division by NEPER'S RODS: first tabulate your divisor; then you have it multiplied by all the digits, out of which you may choose such convenient divisors as will be next less to the figures in the dividend, and write the index answering in the quotient,

quotient, and so continually till the work is done. Thus 2179788 divided by 6123, gives in the quotient 356.

Having tabulated the divisor, 6123, you see that 6123 cannot be had in 2179; therefore take five places, and on the rods find a number that is equal, or next less to 21797, which is 18369; that is, 3 times the divisor, wherefore set 3 in the quotient, and subtract 18369 from the figures above, and there will remain 3428; to which add 8, the next figure of the dividend, and seek again on the rods for it, or the next less, which you will find to be five times; therefore set 5 in the quotient, and subtract 30615 from 34288, and there will remain 3673; to which add 8, the last figure in the dividend, and finding it to be just 6 times the divisor, set six in the quotient.

6123)2179788(356

18369

34288

30615

36738

36738

00000

NEPETA, the tall white sideritis, or catmint, in botany, a genus of the didynamia gymnospermia class of plants; the corolla whereof consists of a single ringent petal, the tube is cylindric and incurvated, and the limb dehiscent; the faux is patent, cordated and terminating in two short segments; the upper lip is erect, roundish and emarginated; the lower one is a roundish, concave, large, entire and serrated; there is no pericarpium, but the seeds, which are roundish, and four in number, are contained in the cup.

Catmint has been greatly recommended as an uterine and nervous medicine. The people in the country still frequently use it in form of an infusion for these purposes, but in the shops it is only kept as an ingredient in some compositions.

NEPHEW, a term relative to uncle and aunt, signifying a brother or sister's son; who, according to the civil law, is in the third degree of consanguinity, but according to the canon in the second.

NEPHRITIC, something that relates to the kidneys. See **KIDNEYS**.

NEPHRITIC STONE, *lapis nephriticus*. See the article **LAPIS**.

NEPHRITIC WOOD, *lignum nephriticum*, a wood of a very dense and compact texture, and of a fine grain, brought us

from New Spain, in small blocks, in its natural state, and covered with its bark. It is to be chosen of a pale colour, sound and firm, and such as has not lost its acrid taste; but the surest test of it is the infusing it in water: for a piece of it infused only half an hour in cold water, gives it a changeable colour, which is blue or yellow, as variously held to the light. If the vial it is in be held between the eye and the light, the tincture appears yellow; but if the eye be placed between the light and the vial, it appears blue. We often meet with this wood adulterated with others of the same pale colour; but the dusky black hue of the bark, is a striking character of this.

The tree is the coatli of Hernandez. It grows to the height of our pear-tree, and its wood while fresh is much of the same texture and colour; the leaves are small and oblong, not exceeding half an inch in length, or a third of an inch in breadth; the flowers are small, and of a pale yellow, and oblong shape, standing in spikes: the cups they stand in are divided into five segments at the edge, and are covered with a reddish down. This is the best description of the tree that can be collected from what has been hitherto written of it; no body having had an opportunity of taking its true characters. This wood is a very good diuretic, and is said to be of great use with the Indians in all diseases of the kidneys and bladder, and in suppressions of urine, from whatever cause. It is also recommended in fevers and obstructions of the viscera. The way of taking it, among the Indians, is only an infusion in cold water.

NEPHRITICS, in pharmacy, medicines proper for diseases of the kidneys, especially the stone. See **STONE**.

Such particularly are the roots of althæa, dog's grass, asparagus, fago, pellitory of the wall, mallows, pimpinella, red chick-pease, peach-kernels, turpentine, the nephritic stone, the nephritic wood, &c. and diuretics. See **DIURETICS**, &c.

NEPHRITIS, in medicine, an inflammation of the kidneys. See the article **INFLAMMATION**.

The symptoms of the nephritis, according to Boerhaave, are a great inflammatory, pungent, burning pain in the place where the kidneys are situated, attended with a fever. The urine is made often, but small in quantity, and very red, or flame-coloured, yet in the highest degree of the disease, watery. There

There is a numbness of the thigh, a pain in the groin, and the testicle of the same side, a pain in the ilium, bilious vomiting, and continual eructations.

When the inflammation is deep, says Hoffman, the fever violent, the burning pain in the loins lasting, the difficulty of making water great, the body very costive, the anxiety and straitness of the precordia exquisite, the urine crude and white, and finally when the pain continues to the fourteenth day, the kidney will suppurate, which is known from the abatement of the pain, and from the thick, purulent sediment of the urine. This will sometimes last several years, till there is nothing left of the kidney but a bag. This is attended with a hectic fever, and the patient before he dies is almost reduced to a skeleton. If the bag happens to burst, it brings on a retention of urine, and intolerable pains, which end in death.

When the disease is favourable, it is cured, according to Boerhaave, by resolution, or a copious red and thick urine discharged at one time; or, by a large flux of blood from the hæmorrhoidal veins, in the beginning of the disease. It is cured also by plentiful bleeding, revulsion, and dilution; and by soft emollient, antiphlogistic decoctions. Hoffman thinks emollient clysters without any saline or purging stimulus, the principal help in this disease. They may be made of milk, whey, or soft water, in which elder and camomile-flowers have been boiled; to which add an ounce or two of syrup of marsh-mallows, and a dram of nitre. The body should be kept open with oil of sweet almonds; and wind in the bowels should be discolled, for which purpose cumin seeds made into comfits are proper. When there are convulsions, or excessive pains, Boerhaave says, that opiates are proper; and that, if the vomiting, a symptom of this disease, is too frequent, warm water sweetened with honey, is beneficial. The patient should avoid all acrimonious aliment; he should neither lie too hot, nor on his back. By this method likewise, a nephritis arising from a stone in the kidney, or ureters, may be cured. When an abscess is formed, the medicines must be powerfully maturing and emollient. When the urine appears purulent, they must be diuretics of medicated waters, whey, and the like, together with balsamics. In this case,

Hoffman recommends emulsions of the four cold seeds and sweet almonds: some attribute a great virtue to cherry-tree gum dissolved in whey and water, and taken often. A syrup of marsh-mallows is very useful; add to these the decoction of veronica, sweetened with honey, mixt with powder of nutmegs.

Arbuthnot says, that butter-milk, not very sour, has been reckoned a great secret in ulcers of the kidneys; and that chalybeat waters have been beneficial to some: he says, that spruce-beer is a good balsamic in this case, and advises soft malt-liquors rather than wine. If the disease ends in a schirrus, there will be a palsey, or a lameness of the adjacent thigh, says Boerhaave, as also an incurable evil; whence will proceed a renal tabes. When there is a sudden remission of the pain, a cold sweat, a weak intermitting pulse, hiccoughing, a stoppage of urine; or when it is livid, black, full of hairs, fetid, abounding with brown or black caruncles, and a sudden loss of strength, there is a mortal gangrene.

NEPHROTOMY, a species of lithotomy. See the article **LITHOTOMY**.

NEPOTISM, a term used in Italy, in speaking of the authority which the popes nephews and relations have in the administration of affairs, and of the care the popes take to raise and enrich them. Many of the popes have endeavoured to reform the abuses of nepotism, which at present is said to be abolished.

NEREIDS, in the pagan theology, sea-nymphs, daughters of Nereus and Doris. Hesiod reckons up fifty of them; and Homer *Paſ. ſ. v. 39. & seq.* gives us a list and description of thirty-nine nereids: Virgil's list of the nereids is shorter, but diversified with pretty circumstances, as may be seen *Georg. lib. iv. v. 336 & seq.*

The nereids were esteemed very handsome, insomuch that Cassiope, the wife of Cepheus, king of Ethiopia, having triumphed over all the beauties of the age, and daring to vie with the nereids, they were so enraged that they sent a prodigious sea-monster into the country; and to appease them she was commanded by the oracle to expose her daughter Andromeda, bound to a rock, to be devoured by the monster.

In antient monuments the nereids are represented riding upon sea-horses, some-

times with an entire human form, and, at other times, with the tail of a fish.

NEREIS, in the history of shell-fish, the same with the stomatia. See STOMATIA.

NEREIS, in the history of insects, a genus of insects of the order of the gymnarthria, the body of which is of a cylindric figure, and the tentacula four in number, but two of them are usually very short, and often scarce perceptible.

NERICIA, a province of Sweden, bounded by Westmania, on the north; by Sunderland, on the east; and by Gothland on the south and west.

NERIUM, the ROSE BAY, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of a single infundibuliform petal; the tube is cylindric, and shorter than the cup; the limb is very large and divided into five broad, obtuse, oblique segments; the fruit consists of two cylindric, acuminate, long, erect follicles, formed each of one valve, and opening longitudinally; the seeds are numerous, oblong, coronated with a downy matter, and placed in an imbricated manner.

NERVES, *nervi*, in anatomy, are cylindrical whitish parts, usually fibrous in their structure; or composed of clusters of filaments, arising from the brain, or rather from its medulla oblongata within the skull, and from the spinal marrow, and running from thence to every part of the body.

Structure and use of the NERVES. This is easily perceived in most of the larger, and some of the smaller ones: for besides the blood-vessels they receive, and the membranes they are surrounded with, they are seen to be composed of a fibrous matter; or, as it were, of bundles or clusters of white, cylindrical, and very slender filaments; which, on the strictest examination, appear to be solid, and without any cavity. Liewenhoeck indeed affirms, that he had often found a cavity in them; but he is not free from errors in many of his microscopical observations. But though we cannot discover any cavity, much less a fluid contained in them; yet it is very possible that there may be such cavities, and such a fluid, only too small to be perceived by us: and for the actual existence of such a fluid, known by the name of animal spirits, many probable arguments are adduced.

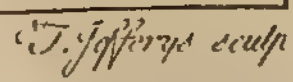
The great use of the nerves, therefore; though we are not able perfectly to de-

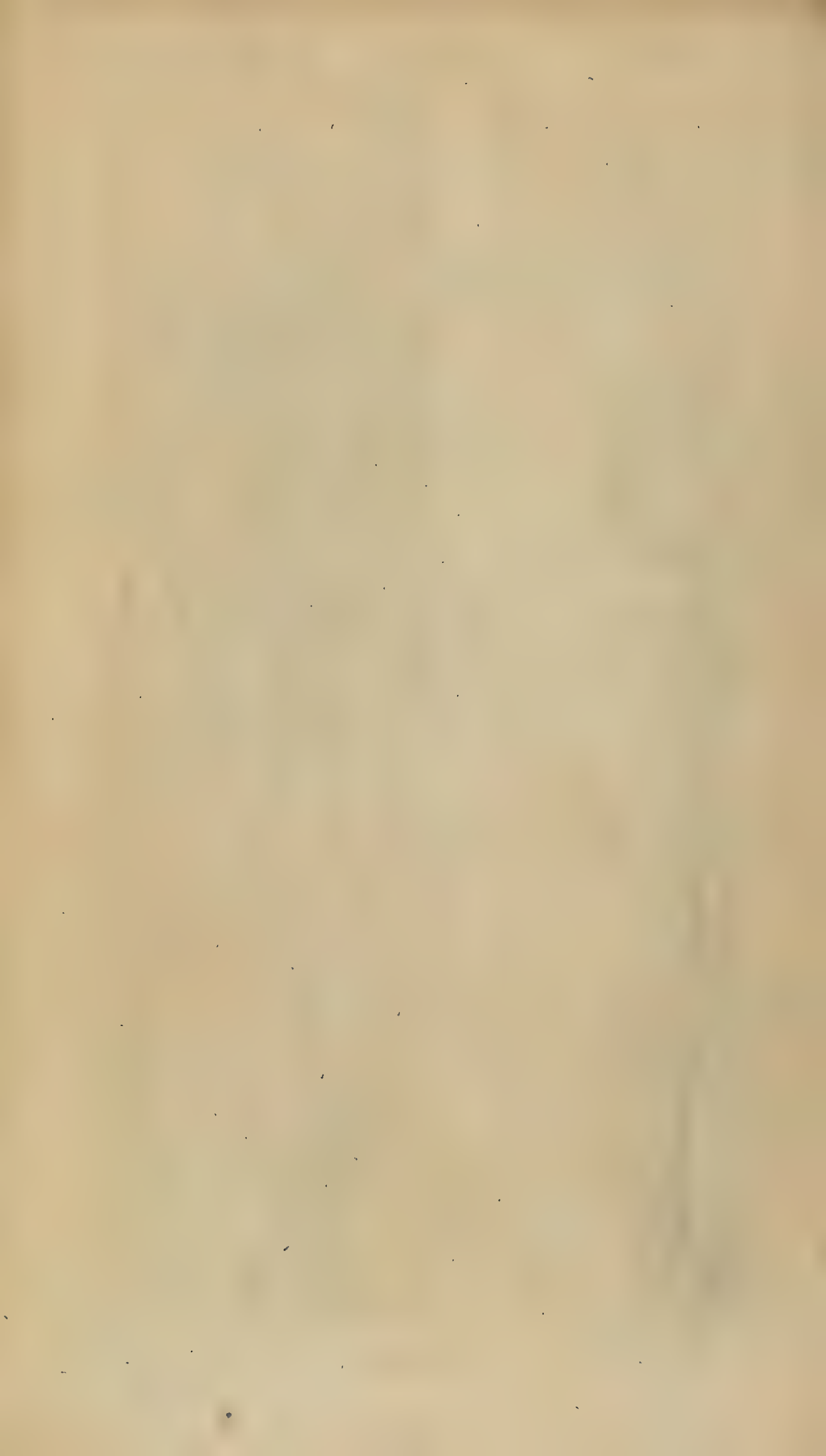
monstrate it, seems to be to convey to all parts of the body a fluid of an extremely subtle kind, secreted in the brain and spinal marrow, and destined for no less noble a purpose than the sensation, motion, and nutrition of the several parts of the whole human fabric. Those who would enter farther into this subject, may consult Heister's Anatomy, Boerhaave's chapter on the brain, in his institutes; Morgagni's Adversar. where he treats it judiciously and deeply; and after these, Burggrave on the existence of the animal spirits. See also the article BRAIN.

The ancients found, that by cutting, tying or compressing any nerve, or any other way intercepting its communication with the brain, the parts to which it belonged were immediately deprived of all sense and motion. One remarkable instance of this is, the making an animal dumb by tying the nerves near the wind-pipe. We read in Galen, of a boy who became quite dumb by having both the recurrent nerves divided. The experiment of cutting these nerves in brute animals, was repeated and confirmed by Vesalius; and Dr. Martin assures us, he tried it successfully on a pig; nor did the animal recover its voice, as some have suspected it might. As the voice depends on a proper aperture of the glottis, it seems likely that, when the recurrent nerves are cut, the glottis will always stand open, and be incapacitated from being shut at the will of the animal. An anonymous physician offers what he calls an experimentum crucis, in proof of the nerves being composed of cylindrical canals, containing a fluid: it is the demonstration of the optic nerve inflated and dried, which appears canular to the naked eye. See the article EXPERIMENTUM CRUCIS.

Origin, distribution, and names of the NERVES. The nerves are usually divided into two kinds, those which arise from the brain, and those arising from the spinal marrow. See plate CLXXXVII, fig. 1 and 2.

The nerves of the brain are nine pair.
1. The olfactory pair, (*ibid.* fig. 2. a, a.) which passing through the os cribrosum, are spread over the membrane of the nostrils. 2. The optic pair, (*ibid.* b, b.) which by their expansion form the retina of the eye. 3. The motary pair of the eyes, (*ibid.* c, c.) each of which is divided, near the orbit, into six parts, or branches;





branches; of which, in human subjects, the first branch goes to the elevator palpebræ; the second, to the elevator of the eye; the third, to the depressor; the fourth, to the adducens; the fifth to the inferior oblique muscle; and the sixth, into the tunics of the eye: but, in other animals, they are divided much otherwise. 4. The pathetic pair of Willis, (*ibid. d, d.*) which are very small, and run to the trochlear muscle of the eye. 5. The gustatory pair, which are very large, and divided within the cranium into three branches, (*ibid. f, f.*) immediately under the dura mater: of these the first branch, called the ophthalmic, runs to various parts of and about the eye, the eye-lids, the muscles of the forehead and nose, and the integuments of the face. The second branch may be called the superior maxillary one, as being finally distributed through all parts of the upper jaw, the lips, nose, palate, uvula, gums, teeth: a branch of it also runs to the ear, and joining with a branch of the seventh pair, forms the chorda tympani. The third branch may be called the maxillaris inferior, as being distributed over the several parts of the lower jaw, the tongue, and other parts of the mouth; whence the whole pair of nerves has obtained the name of par gustatorium; though a great part of them serves to very different purposes, and is carried to parts that have nothing to do with tasting. 6. The abducent pair, (*ibid. g, g.*) except a branch for the formation of the intercostal nerve, is wholly carried to the abducent muscle of the eye; whence its name. The intercostal nerve (*ibid. fig. 1 and 2, i, i, i, l, m, &c.*) is formed either of ramifications of the two preceding nerves, or only of those of the sixth pair. It makes its way out of the cranium by the passage of the internal carotid, and descends near the eighth pair through the neck; and thence through the breast and abdomen, even to the pelvis; and in its way, makes various plexuses and ganglia, and sends branches to almost all the parts contained in the breast and abdomen. 7. The auditory pair, (*ibid. h, h.*) arise with two trunks; the one of which is called the portio dura, or hard portion; the other the portio mollis, or soft portion. This last enters the foramen of the os petrosum, and thence through various little apertures gets into the la-

byrinth of the ear, where it is expanded over all its parts, and constitutes the primary organ of hearing. The harder portion, passing the aquæduct of Fallopius, sends back one branch into the cavity of the cranium: it also sends off another branch, which helps to form the chorda tympani; and others to the muscles of the tympanum. The rest of this pair goes to the external ear; the pericranium, the muscles of the os hyoides, the lips, the eye-lids, and the parotids. 8. The parvagus (*ibid. k, k, k.*) with the accessorius of Willis, pass out near the lateral sinuses of the dura mater, and, descending through the neck and thorax to the abdomen, send out branches by the way to the larynx, the pharynx, the heart, the lungs, and especially to the stomach. It also sends off from the upper part of the thorax, large branches, which are variously implicated in the neck, thorax, and abdomen, with the linguals, the cervicals, and the intercostals. 9. The lingual pair go immediately to the tongue, and are called by some the motary nerves of the tongue; but by others, with more justice, the gustatory nerves.

We are to observe, says Heister, that the pair of nerves, which the generality of writers have called the tenth pair of the head, are, for many unanswerable reasons, to be properly called the first pair of nerves of the neck.

Of the nerves which arise from the spinal marrow, they are properly thirty-two pair.

Those of the neck are no less than eight pair; and from them there are innumerable branches distributed through the muscles of the head, the neck, the scapula, and the humerus, marked A, B, C, D, &c. to O, O, the eighth and last pair: from the third, fourth, and fifth pair are formed the nerves of the diaphragm; and the sixth, seventh, and eighth pair, together with P P, the first pair of the back, form the six robust nerves of the arms and hands. To this division is the accessory spinal nerve of Willis to be referred, which arises about the origin of the third or fourth pair.

The nerves of the back are twelve pair marked P P, Q Q, R, S, &c. to Z and a, β, &c. which, besides the branch they give to the brachial nerves, run entirely in the same furrow along the course of the ribs, and are dispersed over the pleura,

pleura, the intercostal, pectoral, and abdominal muscles, the breast, and other parts of the thorax.

The nerves of the loins are five pair, marked τ , ϕ , ω , Γ , Θ ; with their branches, α , χ , ψ , &c. These are in general dispersed over the loins, the peritonæum, and the integuments and muscles of the abdomen: and besides this, their first pair often gives, on each side, a branch to the diaphragm. The second pair after inosculating with the branches of the first, third, and fourth pair, forms the crural nerves, 6 6, 7 7, 8 8, &c. which are distributed over the anterior part of the thigh: and in the same manner, a branch is formed of the conjunctions of the second, third, and fourth pair, which passes through the great foramen of the os pubis to the scrotum, the testicles, and the adjoining parts. The fourth and fifth pair of the nerves of the loins, joining with the first, second, third, and fourth pair of the os sacrum, compose the nerve called ischiatic, which is the largest in the body, being marked 3, 3, in fig. 2. it descends along the hinder part of the thigh, and its branches are distributed over the whole leg, the foot and toes; being marked 15, 17, 18, &c.

The nerves of the sacrum form five or six pair, though not always determinately and regularly so: they pass through the foramina of this bone, and the superior ones of them, as already observed, compose the ischiatic nerve; and what remains is dispersed, in a multitude of ramifications, over the parts contained in the pelvis, the intestinum rectum, the bladder, the parts of generation, and the parts adjacent. They are marked, in the figure, Λ , Ξ , Π , Σ , &c.

We shall only add, that 1, 1, fig. 2. represent the brachial nerves; 2, 2, &c. the communications of the vertebral nerves with the intercostals; l , l , remarkable communications between the phrenic nerves and the intercostals; t , u , u , &c. the accessory nerve of the eighth pair; x , x , the phrenic nerves; and z , z , the nerves which go to the testes, uterus, &c.

Wounds of the NERVES. Upon the division of a nerve, Heister observes, that the limb to which that nerve was extended becomes instantly rigid, void of sensation, and withers: so that it is no wonder that a man instantly expires, upon the division of those nerves which are sent to the heart or diaphragm: a wound is also attended

with great danger where the nerve is only partially wounded, and not entirely divided; for the wounded fibres contract themselves, and those which remain undivided suffer too great an extension, which will bring on most violent pains, spasms, convulsions, inflammations, and gangrenes, and sometimes death itself.

Consent of the NERVOUS parts. See the article CONSENT.

NEST, *nidus*. See the article NIDUS.

NESTORIANS, a christian sect, the followers of Nestorius, bishop and patriarch of Constantinople; who, about the year 429, taught that there were two persons in Jesus Christ, the divine and the human, which are united, not hypostatically or substantially, but in a mystical manner: whence he concluded, that Mary was the mother of Christ and not the mother of God. For this opinion, Nestorius was condemned and deposed by the council of Ephesus; and the decree of this council was confirmed by the emperor Theodosius, who banished the bishop to a monastery.

Those christians who at this day are called nestorians and chaldeans, are very numerous, and are spread over Mesopotamia, and along the river Tigris and Euphrates: they are even got into the Indies, and into Tartary and China. Those of India settled there under a nestorian priest called John, who, in the year 1145, got himself declared king of Indostan, and grew very famous under the name of Prester John. The nestorians, though they speak the language of the respective countries, only officiate in the chaldee or syriac tongue. The nestorian monks are habited in a black gown tied with a leathern girdle, and wear a blue turban. The nuns are dressed much after the same manner, excepting that they tie a kind of black veil about their heads and about their chins. They must be forty years old before they take the monastic habit.

NET, a device for catching fish and fowl. See the article FISHERY.

The taking fowls by nets, is the readiest and most advantageous of all others, where numbers are to be taken. The making the nets is very easy, and what every true sportsman ought to be able to do for himself. All the necessary tools are wooden needles, of which there should be several of different sizes, some round and others flat: a pair of round-pointed and flat scissars, and a wheel to wind

wind off the thread. The packthread is to be of different strength and thickness, according to the sort of birds to be taken; and the general size of the meshes, if not for very small birds, is two inches from point to point. The nets should neither be made too deep nor too long, for they are then difficult to manage; and they must be verged on each side with twisted thread. The natural colour of the thread is too bright and pale, and is therefore in many cases to be altered. The most usual colour is the russet, which is to be obtained by plunging the net after it is made, into a tanner's pit, and letting it lie there till it be sufficiently tinged: this is of a double service to the net, since it preserves the thread as well as alters the colour. The green colour is given by chopping some green wheat and boiling it in water, and then soaking the net in this green tincture. The yellow colour is given in the same manner with the decoction of celandine, which gives a pale straw-colour, which is the colour of stubble in the harvest-time. The brown nets are to be used on ploughed lands, the green on grass grounds, and the yellow on stubble lands.

NETE DIEZEUGMENON, in the antient music, one of the chords of the greek system, answering to the *E si mi* of the third octave of the modern. See the article DIAGRAM.

NETE HYPERBOLÆON, in antient music, the highest or most acute of the chords of the antient diagram, answering to the *A mi la* of the third octave of the organ.

NETE SYNEMMENON, in antient music, the highest chord of a tetrachord, or fourth, of the greek system, added to make B flat fall between the *mese* and *paramese*, or our A and B, which till then had the interval of a tone-major between them. This chord has the same sound with the paranete diezeugmenon, or our D by B flat. See DIAGRAM.

NETHERLANDS, antiently called Belgia, but since denominated Low-Countries, or Netherlands, from their low situation, are situated between 2 and 7° of east longitude, and between 50 and 53° 30' of north latitude; and are bounded by the german-sea on the north; Germany on the east; by Lorrain and France on the south; and by another part of France and the british seas on the west; extending near three hundred

miles in length from north to south, and two hundred miles in breadth from east to west. They consist of seventeen provinces; ten of which are called the austrian and french Netherlands, and the other seven United-Provinces.

NETTINGS, in a ship, a sort of grates made of small ropes, seized together with rope-yarn or twine, and fixed on the quarters and in the tops; they are sometimes stretched upon the ledges from the waste-trees to the roof-trees, from the top of the fore-castle to the poop; and sometimes are laid in the waste of a ship to serve instead of gratings.

NETTLE, *urtica*, in botany. See the article URTICA.

The root of the common-nettle is accounted diuretic and lithontriptic: it serves also to purify the blood, and is good in spittings of blood, hæmorrhages, and the menfes. The seeds of the roman-nettle are recommended in the asthma, and other disorders of the lungs.

Dead NETTLE. See LAMIUM.

NETTLE-TREE, *celtis*. See CELTIS.

NETTUNO, a port-town of Italy, in the Compagna di Roma: situated on the Mediterranean, thirty miles south-east of Rome.

NEUENSTAT, a town of Germany, twelve miles north-east of Hailbron.

NEVERS, a city of France, capital of the Nivernois: east long. 3° 15', north lat. 46° 50'.

NEUFCHATTEAU, a town of Luxemburg, twenty miles north-east of Sedan.

NEUFCHATEL, the capital of the counties of Neufchatel and Vallengin, in Switzerland, which together form one free and independent state, subject to the king of Prussia: east long. 6° 35', north lat. 47° 10'.

NEUFCHATEL is also a town of Normandy, in France, twenty-three miles north-east of Rouen.

NEVIN, or NEWIN, a market-town of North-Wales, eighteen miles south-west of Caernarvon.

NEVIS, one of the Caribbee-islands, divided from the east end of St. Christophers by a narrow channel.

NEURADA, in botany, a genus of the decandria-monogynia class of plants, the flower of which consists of five equal petals, and its fruit is an orbiculated depressed capsule, convex on the under-part, and every where armed with ascendent prickles: it contains ten cells, in each of which is a single seed.

NEU.

NEURITICS, in pharmacy, medicines good in disorders of the nerves.

NEUROGRAPHY, signifies a description of the nerves, as neurology does a discourse concerning them. See **NERVES**.

NEUROPTERA, in the history of insects, a name given to that class of insects, which have membranaceous wings, with nerves and veins disposed in a reticulated form in them.

NEUSTAT, a city of Germany, thirty miles south of Vienna.

NEUSTAT is also a town of lower-Saxony, sixteen miles north-west of the city of Hanover.

NEUTER, or **NEUTER-GENDER**, in grammar, one of the three genders of nouns, so called as being neither masculine nor feminine. See the article **GENDER**.

NEUTER-VERBS. See the article **VERB**.

NEUTRAL-SALTS, among chemists, a sort or salts neither acid nor alkaline, but partaking of the nature of both. See the articles **ACID** and **ALKALI**.

The principal salts of this kind, are common-salt, nitre, aphronitre, the essential salts of plants, and those obtained, by boiling, from some medicinal waters. Such temperate and neutral salts, are both safest and most efficacious in curing many of the disorders incident to mankind. They are known by making no degree of effervescence, either with acids or alkalies, but become quite saturated upon the affusion of such liquors.

NEUTRALITY, the state of a person or thing that is neuter, or that takes part with neither side.

NEW-MOON, *neomenia*, strictly speaking, is the state of the moon a little after her conjunction with the sun; though it is often used for the conjunction itself. See the articles **MOON** and **NEOMENIA**.

NEWARK, a borough-town of Nottinghamshire, fifteen miles north east of Nottingham.

It sends two members to parliament.

NEWBOROUGH, a market-town of Anglesey, fifteen miles north-west of Beaumaris.

NEWBURG, a city of Bavaria, in Germany, twenty-eight miles north-east of Augsburg.

NEWBURG is also the name of two other towns of Germany; one in Swabia, twenty-five miles west of Stuttgart; and the other, likewise in Swabia, twelve miles north of Basil.

NEWBURY, a market-town of Berkshire, fifteen miles west of Reading.

NEWCASTLE, the county-town of Northumberland, situated on the river Tyne: west long. $1^{\circ} 10'$, north lat. 55° .

It sends two members to parliament.

NEWCASTLE, a borough-town of Staffordshire, ten miles north of Stafford. It sends two members to parliament.

NEWCASTLE, a market-town of Carmarthenshire, in South-Wales, fifteen miles north of Carmarthen.

NEWEL, in architecture, is the upright post which a pair of winding-stairs turn about: this is properly a cylinder of stone which bears on the ground, and is formed by the end of the steps of the winding-stairs. There are also newels of wood, which are pieces of timber placed perpendicularly, receiving the tenants of the steps of the wooden-stairs into their mortices, and on which are fitted the shafts and rests of the stair-case, and the flights of each story.

NEWFIDLERS SEA, a lake thirty-five miles long, on the north-west part of Upper Hungary.

NEW-FOREST, a part of Hampshire, opposite to the Isle of Wight, appropriated by act of parliament for the growth of oaks to build the royal navy. See the article **FOREST**.

NEWFOUNDLAND, a triangular island, three hundred and fifty miles in length from north to south, and two hundred miles in breadth at the base, from east to west; situated in North-America, between 55° and 61° of west longitude, and between 47° and 52° of north latitude: bounded by the narrow freights of Belisle on the north; by the Atlantic-ocean on the east and south; and by the bay of St. Lawrence on the west. It is subject to England; but the fishing-banks on this coast are frequented by most european nations.

NEW-ENGLAND. See **ENGLAND**.

NEWHAUSEL, a city of Upper Hungary, situated on the river Neytra: east long. $18^{\circ} 12'$, north lat. $48^{\circ} 25'$.

NEWMARK, a city of Transilvania, subject to the house of Austria: east long. $23^{\circ} 25'$, north lat. $47^{\circ} 35'$.

NEWMARK is also a town of Germany in the palatinate of Bavaria, thirty miles north-west of Ratisbon.

NEWMARKET, a market-town, situated both in Cambridgeshire and Suffolke, twelve miles east of Cambridge.

NEWN-

NEWNHAM, a market-town, ten miles south-west of Gloucester.

NEWPORT, a port-town of Flanders, nine miles south-west of Ostend.

NEWPORT is also a borough town of the Isle of Wight, which sends two members to parliament.

NEWPORT is also a borough of Cornwall, ten miles west of Launceston, which sends two members to parliament.

NEWPORT is also the name of several market-towns; one fifteen miles east of Shrewsbury; another eighteen miles south-west of Monmouth; and a third sixteen miles north-east of St. Davids.

NEWPORT-PAGNEL, a market-town, sixteen miles north of Aillsbury.

NEWSTAT, the name of several towns; one eight miles north of Landau; another fifteen miles south-west of Ratisbon; a third in Silesia, fifteen miles south of Breslaw; a fourth in Hungary, sixty-five miles east of Tockay; and a fifth in Moravia, ten miles north of Olmutz.

NEWT, or **EFT**, in zoology. See the articles **EFT** and **LIZARD**.

NEWTON, a borough-town, thirty-five miles south of Lancaster.

It sends two members to parliament.

NEWTON is also a borough town in the Isle of Wight, twelve miles south of Southampton: it sends two members to parliament.

NEWTONIAN-PHILOSOPHY, the doctrine of the universe, and particularly of the heavenly bodies; their laws, affections, &c. as delivered by Sir Isaac Newton.

The term Newtonian philosophy is applied very differently by different authors. Some, under this philosophy, include all the corpuscular philosophy, considered as it now stands corrected and reformed by the discoveries and improvements made in the several parts thereof by Sir Isaac Newton. In this sense it is that 's Gravesande calls his Elements of Physics, an Introduction to the Newtonian philosophy; and in this sense, the newtonian is the same with the new philosophy, in opposition to the cartesian, the peripatetic, and the antient corpuscular philosophy. See **CARTESIAN**, &c. Others, by newtonian philosophy, mean the method or order which Sir Isaac observes in philosophizing, viz. the reasoning and drawing of conclusions directly from phænomena, exclusive of all previous hypotheses; the beginning from simple principles, deducing the first powers and laws of nature from a few select phænomena, and then applying those

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laws, &c. to account for other things: and in this sense, the newtonian is the same with the experimental philosophy. See the article **EXPERIMENTAL**.

Others again, by newtonian philosophy, mean that wherein physical bodies are considered mathematically, and where geometry and mechanics are applied to the solution of phænomena; in which sense, the newtonian is the same with the mechanical and mathematical philosophy. See the article **MECHANICAL**.

Others again, by newtonian philosophy, understand that part of physical knowledge which Sir Isaac Newton has handled, improved, and demonstrated in his Principia.

And, lastly, others, by newtonian philosophy, mean the new principles which Sir Isaac has brought into philosophy, the new system founded thereon, and the new solutions of phænomena thence deduced; or that which characterizes and distinguishes his philosophy from all others: and this is the sense, in which we shall chiefly consider it.

As to the history of this philosophy, we have but little to say: it was first made public in 1686, by the author, then a fellow of Trinity-college, Cambridge; and in the year 1713, republished with considerable improvements. Several other authors have since attempted to make it plainer, by setting aside many of the more sublime mathematical researches, and substituting either more obvious reasonings or experiments in lieu thereof; particularly Mr. Whiston, in his Prelect. Phys. Mathem. 's Gravesande, in his Elem. and Inst. and lately, by the learned Comment of Le Seur and Jacquier upon Sir Isaac's Principia.

The philosophy itself is laid down chiefly in the third book of the Principia; the two preceding books being taken up in preparing the way, and laying down such principles of mathematics as have the most relation to philosophy: such are the laws and conditions of powers; and these, to render them less dry and geometrical, the author illustrates by scholia in philosophy, relating chiefly to the density and resistance of bodies, the motion of light and sounds, a vacuum, &c. In the third book he proceeds to the philosophy itself; and from the same principles deduces the structure of the universe, and the powers of gravity, whereby bodies tend towards the sun and planets; and, from these powers, the motions of the planets and comets, the theory of the

moon and the tides. This book, which he calls *de Mundi Systemate*, he tells us, was first wrote in the popular way; but considering, that such as are unacquainted with the said principles, would not conceive the force of the consequences, nor be induced to lay aside their antient prejudices; for this reason, and to prevent the thing from being in continual dispute, he digested the sum of that book into propositions, in the mathematical manner, so as it might only come to be read by such as had first considered the principles; not that it is necessary a man should master them all, many of them even the first rate mathematicians would find a difficulty in getting over. It is enough to have read the definitions, laws of motion, and the three first sections of the first book; after which, the author himself directs us to pass on to the book *De Systemate Mundi*.

The great principle on which the whole philosophy is founded, is the power of gravity: this principle is not new; Kepler, long ago, hinted it in his *Introduct. ad Mot. Martis*. He even discovered some of the properties thereof, and their effects in the motions of the primary planets; but the glory of bringing it to a physical demonstration, was reserved to the english philosopher. See the article **GRAVITATION**.

His proof of this principle from phænomena, together with the application of the same principle to the various other appearances of nature, or the deducing those appearances from that principle, constitute the newtonian system: which, drawn in miniature, will stand thus:

1. The phænomena are, 1. That the satellites of jupiter do, by radii drawn to the center of the planet, describe areas proportional to their times; and that their periodical times are in a sesquiplicate ratio of their distances from its center; in which the observations of all astronomers agree. 2. The same phænomenon holds of the satellites of saturn, with regard to saturn; and of the moon, with regard to the earth. 3. The periodical times of the primary planets about the sun, are in a sesquiplicate ratio of their mean distances from the sun. But, 4. The primary planets do not describe areas any way proportional to their periodical times, about the earth; as being sometimes seen stationary, and sometimes retrograde, with regard thereto. See **SATELLITE, PERIOD, &c.**

2. The powers whereby the satellites of jupiter are constantly drawn out of their rectilinear course, and retained in their orbits, respect the center of jupiter, and are reciprocally as the squares of their distances from the same center. 2. The same holds of the satellites of saturn, with regard to saturn; of the moon, with regard to the earth; and of the primary planets, with regard to the sun. See the article **CENTRAL FORCES**.

3. The moon gravitates towards the earth, and by the power of that gravity is retained in her orbit: and the same holds of the other satellites with respect to their primary planets; and of the primaries with respect to the sun.

As to the moon, the proposition is thus proved: the moon's mean distance is 60 semidiameters of the earth; her period, with regard to the fixed stars, is 27 days, 7 hours, 43 minutes; and the earth's circumference 123249600 Paris-feet. Now, supposing the moon to have lost all her motion, and to be let drop to the earth, with the power which retains her in her orbit, in the space of one minute she will fall $15\frac{1}{12}$ Paris-feet; the arch she describes in her mean motion, at the distance of 60 diameters of the earth, being the versed sign of $15\frac{1}{12}$ Paris-feet. Hence, as the power, as it approaches the earth, increases in a duplicate ratio of the distance inversely; so as at the surface of the earth it is 60×60 greater than at the moon; a body falling with that force in our region must, in a minute's time, describe the space of $60 \times 60 \times 15\frac{1}{12}$ Paris-feet, and $15\frac{1}{12}$ Paris-feet in the space of one second.

But this is the rate at which bodies fall by their gravity at the surface of our earth; as Huygens has demonstrated by experiments with pendulums. Consequently, the power whereby the moon is retained in her orbit, is the very same we call gravity; for, if they were different, a body, falling with both powers together, would descend with double the velocity, and in a second of time describe $30\frac{1}{6}$ feet. See **DESCENT and MOON**.

As to the other secondary planets, their phænomena, with respect to their primary ones, being of the same kind with those of the moon about the earth, it is argued by analogy, they depend on the same causes; it being a rule or axiom all philosophers agree to, that effects of the same kind have the same causes. Again, attraction

traction is always mutual, *i. e.* the reaction is equal to the action: consequently the primary planets gravitate towards their secondary ones, the earth towards the moon, and the sun towards them all. And this gravity, with regard to each several planet, is reciprocally as the square of its distance from the center of gravity. See *ATTRACTION*, &c. 4. All bodies gravitate towards all the planets; and their weight towards any one planet, at equal distances from the center of the planet, is proportional to the quantity of matter in each. See the article *WEIGHT*.

For the law of the descent of heavy bodies towards the earth, setting aside their unequal retardation from the resistance of the air, is this, that all bodies fall equal spaces in equal times; but the nature of gravity or weight, no doubt, is the same on the other planets as on the earth.

Suppose, *e. gr.* such bodies raised to the surface of the moon, and together with the moon deprived at once of all progressive motion, and dropped towards the earth: it is shewn, that in equal times they will describe equal spaces with the moon; and therefore, that their quantity of matter is to that of the moon, as their weights to its weight.

Add, that since jupiter's satellites revolve in times that are in a sesquiplicate ratio of their distances from the center of jupiter, and consequently at equal distances from jupiter, their accelerating gravities are equal; therefore, falling equal altitudes in equal times, they will describe equal spaces; just as in heavy bodies on our earth. And the same argument will hold of the primary planets with regard to the sun, and the powers whereby unequal bodies are equally accelerated, are as the bodies, *i. e.* the weights are as the quantities of matter in the planets, and the weight of the primary and secondary planets towards the sun, are as the quantities of matter in the planets and satellites. See the article *JUPITER*.

And hence are several corollaries drawn relating to the weights of bodies on the surface of the earth, magnetism, and the existence of a vacuum. See the articles *WEIGHT* and *MAGNET*.

5. Gravity extends itself towards all bodies, and is in proportion to the quantity of matter in each.

That all planets gravitate towards each other, has been already shewn; likewise,

that the gravity towards any one, considered apart, is reciprocally as the squares of its distance from the center of the planet; consequently, gravity is proportionable to the matter therein. Further, as all the parts of any planet, A, gravitate towards another planet B; and the gravity of any part is to the gravity of the whole, as the matter of the part to the matter of the whole; and reaction equal to action: the planet B will gravitate towards all the parts of the planet A; and its gravity towards any part will be to its gravity towards the whole, as the matter of the part to the matter of the whole. Hence we derive the methods of finding and comparing weights of bodies towards different planets; of finding the quantity of matter in the several planets, and their densities; since the weights of equal bodies, revolving about planets, are as the diameter of their orbits directly, and as the squares of the periodical times inversely; and the weights at any distance from the center of the planet are greater or less in a duplicate ratio of their distances inversely. And since the quantities of matter in the planets are as their powers at equal distances from their centers; and lastly, since the weights of equal and homogeneous bodies towards homogeneous spheres are, at the surfaces of the spheres, as the diameters of those spheres; and consequently, the densities of heterogeneous bodies are as the weights at the diameters of the spheres.

6. The common center of gravity of the sun, and all the planets is at rest; and the sun, though always in motion, yet never recedes far from the common center of all the planets.

For the matter in the sun being to that in jupiter as 1033 to 1; and jupiter's distance from the sun to the semidiameter of the sun in a ratio somewhat bigger; the common center of gravity of jupiter and the sun will be a point a little without the sun's surface; and by the same means, the common center of saturn and the sun will be a point a little within the sun's surface; and the common center of the earth, and all the planets, will be scarce one diameter of the sun distant from the center thereof: but the center is always at rest; therefore, though the sun will have a motion this and that way, according to the various situations of the planets, yet it can never recede far from

the center; so that the common center of gravity of the earth, sun, and planets, may be esteemed the center of the whole world. See the article PLANET.

7. The planets move in ellipses that have their foci in the center of the sun, and describe areas proportionable to their times. This we have already laid down *a posteriori*, as a phenomenon; and now that the principle of the heavenly motions is shewn, we deduce it therefrom *a priori*. Thus, since the weights of the planets towards the sun are reciprocally as the squares of their distances from the center of the sun; if the sun were at rest, and the other planets did not act on each other, their orbits would be elliptical, having the sun in the common umbilicus, and would describe areas proportionable to the times; but the mutual actions of the planets are very small, and may be well thrown aside. See the article ORBIT.

Indeed the action of jupiter on saturn is of some consequence; and hence, according to the different situation and distances of those two planets, their orbits will be a little disturbed. The earth's orbit too is sensibly disturbed by the action of the moon; and the common center of the two describes an ellipsis round the sun placed in the umbilicus; and, with a radius drawn to the center of the sun, describes areas proportionable to the times. See the article EARTH, &c.

8. The aphelia and nodes of the planets are at rest, excepting for some inconsiderable irregularities arising from the action of the revolving planets, and comets. Consequently, as the fixed stars retain their position to the aphelia and nodes, they too are at rest. See the article NODES, &c.

9. The axis, or polar diameter, of the planets is less than the equatorial diameter.

The planets, had they no diurnal rotation, would be spheres, as having an equal gravity on every side: but by this rotation the parts receding from the axis endeavour to rise towards the equator, which, if the matter they consist of be fluid, will be affected very sensibly. Accordingly, jupiter, whose density is found not much to exceed that of water on our globe, is observed by astronomers to be considerably less between the two poles than from east to west. And, on the same principle, unless our earth were higher at the equator than towards the poles, the

sea would rise under the equator, and overflow all near it. But this figure of the earth Sir Isaac Newton proves likewise *a posteriori*, from the oscillations of pendulums being slower and smaller in the equinoctial, than in the polar parts of the globe. See the article EARTH.

10. All the moon's motions, and all the inequalities of these motions, follow from these principles, *e. gr.* her unequal velocity, and that of her nodes and apogee in the syzygies and quadratures; the differences in her eccentricity and her variation. See the article MOON.

11. From the inequalities of the lunar motions, we can deduce the several inequalities in the motions of the satellites.

12. From these principles, particularly the action of the sun and moon upon the earth, it follows, that we must have tides, or that the sea must swell and subside twice every day. See TIDES.

13. Hence, likewise, follows the whole theory of comets, as that they are above the region of the moon, and in the planetary spaces; that they shine by the sun's light, reflected from them; that they move in conic sections, whose umbilici are in the center of the sun; and, by radii drawn to the sun, describe area's proportional to the times; that the orbits or trajectories are very nearly parabolas; that their bodies are solid, compact, &c. like those of the planets, and must therefore acquire an immense heat in their perihelia; that their tails are exhalations arising from and encompassing them like atmospheres. See the article COMET.

NEYLAND, a market-town of Suffolk, fourteen miles south-west of Ipswich.

NIAGARA, a prodigious cataract in Canada, in North America, between the lakes Erie and Ontario, where the water falls from high rocks 156 feet perpendicular. The mist which this fall occasions may be seen at fifteen miles distance rising as high as the clouds, and forming a beautiful rainbow.

NIRANO, a town of Italy, in the duchy of Parma, thirty-five miles west of Parma.

NICARAGUA, a province of Mexico, bounded by the province of Honduras, on the north; by the North-sea on the east; by the province of Costarica, on the south-east; and by the South-sea, on the south-west; being 400 miles long, and 120 broad. Nicaragua lake runs through the middle of the province.

NICARIA, one of the islands of the Archipelago;

chipelago, in Asiatic Turkey: east lon. $26^{\circ} 5'$ north lat. 37° .

NICASTRO, a town of Naples, in the territory of Calabria: east long. $16^{\circ} 40'$, north lat. $39^{\circ} 15'$.

NICE, the capital of the county of the same name, situated on the Mediterranean, at the mouth of the river Var: east long. $7^{\circ} 15'$, north lat. $43^{\circ} 40'$.

NICE is also a town of Asiatic Turkey, fifty miles south-east of Constantinople.

NICHE, in architecture, a hollow sunk into a wall, for the commodious and agreeable placing a statue.

The ordinary proportion of a niche is to have two circles in height and one in width; but M. Le Clerc makes their height something more, the excess being to compensate for the height of the pedestal of the statue. The hollow is semicircular at bottom, that is, in its plan; and at top it terminates in a kind of canopy. Niches have frequently an impost, and an archivolt or head-band, and the canopy wrought and enriched in the manner of a shell. The breadth of the archivolt may be made equal to a sixth or seventh part of the niche, and the height of the impost to a fifth or sixth part of the same: and the impost and archivolt ought to consist of such mouldings as have some relation to the architecture of the place. Niches are sometimes made with rustic-work, sometimes with shell-work, and sometimes of cradle or arbour-work. Niches are sometimes made square, but these want all the beauty of the others.

NICHED COLUMN. See **COLUMN**.

NICHILS, or **NIHILS**, in law. See the article **NIHILS**.

NICOBAR-ISLANDS, a cluster of islands situated in the Indian ocean, at the entrance of the gulph of Bengal, between 7° and 10° north lat.

NICOLAITANS, in church-history, christian heretics who assumed this name from Nicolas of Antioch; who, being a gentile by birth, first embraced judaism, and then christianity; when his zeal and devotion recommended him to the church of Jerusalem, by whom he was chosen one of the first deacons. Many of the primitive writers believe that Nicolas was rather the occasion than the author of the infamous practices of those who assumed his name, who were expressly condemned by the spirit of God himself, Apoc. ii. 6. And indeed their opinions and actions were highly extravagant and

criminal. They allowed a community of wives: made no difference between ordinary meats and those offered to idols: and told I know not what fables of the creation and disposition of the world. According to Eusebius, they subsisted but a short time; but Tertullian says, that they only changed their name, and that their heresies passed into the sect of the cainians. See **CAINIANS**.

St. NICOLAS, a town of Lorrain, ten miles south-east of Nancy, at the mouth of the river Dwina.

St. NICOLAS is also a port-town of Russia situated on the White-sea, six miles below Archangel.

St. NICOLAS'S DAY, a festival of the romish church, observed on the 6th of December.

NICOMEDIA, a city of Asiatic Turkey, thirty miles south-east of Constantinople.

NICOPOLIS, a city of European Turkey, situated on the Danube, 100 miles north-west of Adrianople: east long. 25° , north lat. 43° .

NICOPPING, a city of Sweden, in the province of Sunderland, fifty miles south of Stockholm.

NICOPPING is also the capital of the island Hulsler, subject to Denmark, and forty-eight miles south-west of Copenhagen.

NICOSIA, the capital of the island of Cyprus: east long. 35° , north lat. 35° .

NICOTERA, a port-town of the kingdom of Naples, thirty miles north-east of Reggio.

NICOTIANA, in botany, a plant more commonly known by the name of tobacco. See the article **TOBACCO**.

NICOYA, or **St. LUCAR**, a port-town of Mexico, situated on a bay of the South-sea, in 88° west longitude, and $10^{\circ} 15'$ north latitude.

NICTITATING MEMBRANE, in comparative anatomy, a thin membrane, chiefly found in the bird and fish-kind, which covers the eyes of these animals, sheltering them from the dust or too much light; yet is so thin and pellucid, that they can see pretty well through it.

NIDUS, among naturalists, signifies a nest, or proper repository for the eggs of birds, insects, &c. wherein the young of these animals are hatched and nursed.

NIECE, a brother or sister's daughter, which in the civil law is reckoned the third degree of consanguinity.

NIEMEN, or **BEREZINA**, a river of Poland, which rises in Lithuania, and falls into a bay of the Baltic-sea, near Memel.

NIEN

NIENHUIS, a town of Germany, in the circle of Westphalia: east long. $8^{\circ} 25'$, north lat. $51^{\circ} 40'$.

NIENT COMPRISE, in law, an exception taken to a petition as unjust, because the thing desired is not in the deed on which the petition is founded. Thus on a person's desiring the court to be put in possession of a house, formerly adjudged to him among other lands, the adverse party pleads that the petition ought not to be granted; because though the petitioner had a judgment for certain lands and houses, yet that house is nient comprise, not comprised therein.

NIEPER, or **BORISTHENES**, a river which rises in the middle of Russia, and running south through Poland, enters the russian Ukraïn, separates Little Tartary from Budziac Tartary, and falls into the Black-sea, near Oczakow.

NIESTAT, a town of Lower Saxony, in the dutchy of Mecklenburg: east long. $11^{\circ} 26'$, north lat. $53^{\circ} 40'$.

NIESTAT is also a town of Upper Saxony, in the marquise of Brandenburg, 25 miles north-east of Berlin.

NIESTER, a river which rises in Poland, and running south-east divides Podolia in Poland, from Moldavia in Turkey, and afterwards dividing Bessarabia from Budziac Tartary, falls into the Black-sea near Belgoröd.

NIGELLA, in botany, a genus of the polyandria pentagynia class of plants; the corolla whereof consists of five plane, oval, obtuse, patent petals, narrowest towards the base; the fruit consists of as many capsules, as there were germina, which in some species are five, and in others ten, these capsules are oblong, compressed, acuminate, joined by an internal suture, and open upwards, and inwards; the seeds are numerous angular and rough.

NIGER, a great river of Africa, which runs from east to west through the middle of Negroland, and discharges itself into the Atlantic ocean by three channels, called Rio Grande, Gambia, and the river Senega. It is 300 miles between the northern and southern channels, and all the country between them is annually overflowed, as Egypt is by the Nile.

NIGHT, that part of the natural day during which the sun is underneath the horizon; or that space wherein it is dusky. See the article DAY.

Night was originally divided by the Hebrews, and other eastern nations, into

three parts, or watchings. The Romans, and afterwards the Jews from them, divided the night into four parts, or watches, the first of which began at sun-set and lasted till nine at night, according to our way of reckoning; the second lasted till midnight; the third till three in the morning; and the fourth ended at sun-rise. The antient Gauls and Germans divided their time not by days but by nights; and the people of Iceland and the Arabs do the same at this day. The like is also observed of our saxon ancestors.

NIGHT-MARE, in medicine, a disease called by physicians ephialtes and incubus. See the article INCUBUS.

NIGHT-WALKERS, *Noctambuli*. See the article NOCTAMBULI.

NIGHTINGALE, *lusciniæ*, in ornithology, the brownish-grey motacilla, with the annules of the knees grey. See the article MOTACILLA.

This bird is more eminent for the sweetness of its note, than for its beauty; it is of the size of the linnet, but in shape it more resembles the red-breast; the head is small, the eyes are large, and their iris pale; the beak is dusky, slender, and moderately long; the head, neck and back are of a greyish-brown; the upper parts of the wings, and about the tail, have a tinge of reddish mixt with this; and the throat, breast and belly are of a pale whitish grey.

NIGRITIA, or **NEGROLAND**. See the article NEGROLAND.

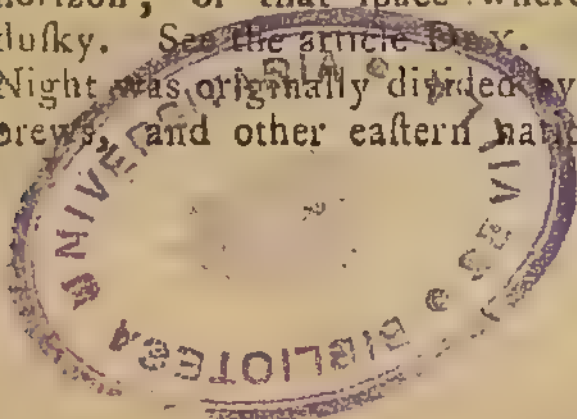
NIHIL CAPIAT PER BREVE, or **PER BILLAM**, in law, the judgment given against the plaintiff in an action either in bar thereof, or in abatement of the writ.

NIHIL DICIT, a failure in the defendant to put in an answer to the plaintiff's declaration, &c. by the day assigned for that purpose, by which omission judgment of course is had against him.

NIHIL DEBET, is the usual plea in an action of debt: but it is no plea in an action of covenant, in a breach assigned for non-payment of rent, &c.

NIHIL HABUIT IN TENEMENTIS, a plea that can be pleaded only in an action of debt brought by a lessor against a lessee without deed: for if it be by indenture of lease it may not be pleaded, the lease being an estoppel: yet it is said, that if it be upon a deed poll, the defendant may plead this plea.

NIHILS, or **NICHILS**, issues which a sheriff who



who is apposed in the exchequer says are nothing worth, and not to be levied, thro' the insufficiency of the parties from whom the same are due.

NILE, a great river in Egypt, having its source in Abyssinia, or the Upper Ethiopia, in 12° north lat. It generally runs from south to north through Abyssinia into Egypt, and then continues its course north in one stream till it comes below Cairo to the Delta, where it divides; one branch discharging itself into the Mediterranean at Damietta, and another a hundred miles to the westward of it at Rosetta. There are great rejoicings every year when the Nile rises to a certain height, their future harvest depending upon it. The instrument used by the antients to measure the height of the water of the Nile in its overflowings, was called nilometer. The just height of the inundation, according to Pliny, is sixteen cubits; when it arises but to twelve or thirteen, a famine is dreaded; and when it exceeds sixteen, there is also danger apprehended. The river begins usually to rise in May or June, and is conveyed by reservoirs, cisterns, and canals, to the fields and gardens as they want it.

As to the Delta, it is all overflowed.

NIMBUS, in antiquity, a circle observed on certain medals, or round the head of some emperors, answering to the circles of light, drawn around the images of saints. The nimbus is seen on the medals of Maurice, Phocas, and others, even of the upper empire.

NIMEGUEN, a city of the united Netherlands, situated on the river Waal, in the province of Guelderland, 52 miles south-east of Amsterdam.

NIMETULAHITES, a kind of turkish monks, so called from their founder Nimetulahi, famous for his doctrines and the austerity of his life. They assemble once a week to sing hymns in praise of God. The candidates for this order are obliged to continue forty days shut up in a chamber, where their daily allowance is but four ounces of food; and no body is permitted to visit them. At the end of this fast the other religious take the novice by the hand and perform a kind of dance, in which they use several extravagant gestures; during which exercise the novice commonly falls down in a trance, at which time they say he receives some extraordinary revelation.

NIMPO, a city and port-town of China,

in the province of Chekiam: east long. 122° , north lat. 30° .

NINEVEH, an antient city of Assyria, was situated on the eastern banks of the river Tygris, opposite to the place where Moussul now stands.

NINOVE, a town of the austrian Netherlands, in the province of Flanders, situated on the river Dender, thirteen miles west of Brussels.

NIO, a small turkish island in the Archipelago, situated north-west of Santorini, remarkable for little but the tomb of Homer, who is said to lie buried here.

NIORT, a town of France, in the province of Orleanois and territory of Poitou, situated on the river Seure, twenty-eight miles north-east of Rochelle.

NIPHON, the largest of the japan islands, situated in the Indian ocean about 130 miles east of China; being 600 miles long, and 150 broad, and containing 55 provinces.

NIPPERS, in the manege, are four teeth in the fore-part of a horse's mouth, two in the upper and two in the lower jaw. A horse puts them forth between the second and third year. See **TOOTH**.

NIPPERS is also an instrument in use among smiths and farriers; being a kind of pincers wherewith, in shoeing a horse, they cut the nails before they rivet them. It is also used in taking off a shoe.

NIPPERS, in a ship, are small ropes about a fathom or two long, with a little truck at one end, and sometimes only a wale-knot. Their use is to help holding off the cable from the main or jeer-capstan, where the cable is so slimy, so wet, and so great, that they cannot strain it, to hold it off with their bare hands.

NIPPLES, *papillæ*, in anatomy. See the article **BREASTS**.

The nipples of women, in their first lying in, are frequently so small, and sunk into their breasts, that the infant cannot get at them to suck its nourishment. Heister observes that the readiest method in this case is to apply an infant somewhat older, and which can draw stronger; or, if this does not succeed, to let a woman who has been practised in the art, attempt to suck. When these do not succeed, it is common to have recourse to a glass pipe, and the poorer people in some places usually make a tobacco pipe serve the turn. Others apply a small cucurbite made of ivory in the form of a hat, which they suck strongly in

in their mouth. The common sucking-glass is also, when properly applied, of very signal service. To do this, the small hole at the side is to be stopped with wax, and the glass heated with warm water; or, by holding it before the fire, so as to rarify, and in part, expel the air. It is then to be applied to the nipple, which, in this case, will not only be pulled out, but will discharge a large quantity of milk, so as to take down the inflammation and tumor in the breast. When the sucking power of the glass is grown weak, the hole at the side is to be opened, and the milk poured out; the glass is then to be heated again, and, the hole being stopped again, is to be a second time applied, and so on, till the intention is fully answered.

NIPPLE-WORT, *lapsana*, in botany. See the article **LAPSANA**.

NISI PRIUS, in law, a judicial writ which lies in cases where the jury being impanelled and returned before the justices of the bank, one of the parties requests to have such a writ, for the ease of the country, in order that the trial may come before the justices in the same county on their coming thither. These trials by nisi prius are intended for the ease of the country, by saving the parties, jurors and witnesses the trouble of coming to Westminster. The purport of a writ of nisi prius is, that the sheriff is thereby commanded to bring to Westminster the men impanelled, at a certain day before the justices, “*nisi prius iusticiarii domini regis ad assisas capiendas venerint*,” that is, unless the justices go before the day into such a county to take assizes. See **JUSTICES**.

NISMES, a fine city of France, in the province of Languedoc: east long. $4^{\circ} 26'$, north lat. $43^{\circ} 40'$.

NISNA, or **NISE-NOVOGOROD**, the capital of the province of Nise, or Little Novogorod, in Russia: east long. 45° , north lat. 56° .

NISSA, a city of european Turkey, in the province of Servia: east long. 23° , north lat. 43° .

NISSA, or **NIZZA**, a town of Italy, in the dutchy of Montferrat: east long. $8^{\circ} 40'$, north lat. $44^{\circ} 45'$.

NITHSDALE, a county of Scotland, bounded by Clydesdale, on the north; by Annandale, on the east; by Solway-frith, on the south; and by Galloway, on the west.

NITRACHT, or **NYTREA**, a town of

Hungary, forty miles north-east of Presburg.

NITRE, or **SALT-PETRE**, is a simple salt, which is pellucid, but somewhat whitish, and in its most perfect pieces is in the form of long and slender crystals, of a prismatic figure, of an equal thickness throughout their whole length, composed of six planes or sides, and terminated at the end by a pyramid, which is small and short in proportion to the size of the column, but composed of the same number of planes. These sprigs vastly resemble the common sprig crystals of the rocks. Nitre is to be chosen in fair, long, and transparent crystals, and such as when applied to the tongue, affects it with a peculiar kind of coldness; such as when set on the fire easily melts, and on being thrown upon it, blazes very furiously, and emits a bright and vivid flame without crackling, and leaves only a very little fixed salt on the coals.

Nitre is found immersed in imperceptible particles in earthy substances, as the particles of metals in their ores; but sometimes it is found native and pure, in the form of an efflorescence or shapeless salt, either on its ore or on old walls. The earth from which nitre is made, both in Persia and the East-Indies, is a kind of marl, found on the bare cliffs on the sides of hills exposed to the northern or eastern winds, and never in any other situation. The people of those countries collect large quantities of this, and having a large and deep pit, which they line with a hard and tenacious kind of clay, they fill it half full of water, and into this they throw the earth; when this is broken and mouldered to powder they add more water, and stirring all well together, they let it stand four or five days; after this they open a hole made in one of the sides of the pit, which lets out all the clear water into a channel of about a foot wide, which is in the same manner clayed within, through which it runs into another very wide and shallow pit, which is prepared in a level ground, and is secured by slight walls on all but the north-east side, and is open to the sun at the top; here the water by degrees evaporates, and the salt which it had imbibed from the earth, crystallizes into small, brownish-white hexaedra, but usually imperfect crystals, which are preserved; and this is the rough saltpetre we receive from the East Indies. The far greater part of the nitre used in the world

world is prepared in this manner; tho' there are many other methods of procuring it. In several of the eastern nations, the ruins of old buildings exposed to the north and east winds, and sheltered from rain, have their walls covered with an efflorescence of a nitrous salt, which they throw into the solution of the salt from the ore, when it will no longer afford any crystals of itself, and by this addition it becomes capable of affording a large quantity of additional crystals like the first. Earths moistened or manured with the excrements of animals, as the earths of pigeon-houses, and the like, all afford more or less nitre; and vast quantities of this salt are annually made in France, by boiling in water the matter of old walls, the old plaster of ruined buildings, and the earths of stables and other places where animals have been fed. Saltpetre is a very profitable branch of commerce in England, and there is no doubt but that great quantities of it might be made; that from the East-Indies pays, on importation, for every 112 lb. 5s. 8 $\frac{40}{100}$ d. and draws back on exportation, 5s. 2 $\frac{70}{100}$ d. That from France, for every 112 lb. pays, on importation, 11s. 7 $\frac{65}{100}$ d. and draws back, on exportation, 6s. 1 $\frac{95}{100}$ d. and the same quantity from all other places pays, on importation, 1s. 11 $\frac{40}{100}$ d. and draws back, on exportation, 1s. 5 $\frac{75}{100}$ d.

Saltpetre is of very great use in the manufactures; besides being the basis of gunpowder, it is used in the making of white glass, and is of the same use as common salt in preserving of foods.

Preparations and uses of NITRE. Purified nitre is one of the capital remedies in medicine. It cools and thins the blood, and gives it a fine florid colour; and therefore in all inflammatory diseases attended with condensations of the blood, this salt proves excellently cooling and attenuating. It is greatly serviceable in pleurifies, peripneumonies and quinries, in the suppression of urine, and in the small pox.

For the manner of purifying nitre, see the article GUNPOWDER.

The other preparations of nitre are Glauber's spirit of nitre, the sweet spirit of nitre, vitriolated nitre, and aquafortis.

1. Spirit of nitre is prepared as follows: dry eighteen ounces of nitre, and reduce it to an impalpable powder: put it into a clean retort, and pour upon it six ounces

of highly rectified oil of vitriol; place the retort immediately in a sand furnace, and apply a large receiver, luting the juncture with Windsor-loam. Let the fire be gentle at first, increasing it gradually till it rises to the utmost heat a sand furnace is capable of, then, when no more comes over, let all cool; and pour the liquor out of the receiver into a bottle under a chimney, taking care to avoid the dangerous fumes, and stop it close up for use. This spirit dissolves silver, and most of the other metals and semi-metals, and even stones of all kinds; except such as have crystal for their basis. 2. Sweet spirit of nitre is thus prepared: take of rectified spirit of wine, one quart; of Glauber's spirit of nitre, half a pound; mix them by pouring the spirit of nitre on the other, and distil the mixture with a gentle heat, as long as what comes off will not raise any fermentation with a lixivial salt. This is a noble diuretic and carminative. It is given in the stone and gravel with great success, as also in jaundices and dropsies; and it is of great service in restoring the appetite when depraved by a mucous flegm. The dose is from fifteen to thirty drops in wine and water. 3. Vitriolated nitre is thus prepared: dissolve the cake left after the distillation of Glauber's spirit of nitre, in hot water, and after filtrating the solution through paper, evaporate, that the salt may shoot. This has much the same virtues as tartarum vitriolatum, and is frequently sold under its name. 4. Aquafortis, for the preparation and uses of which, see the article AQUAFORTIS.

NITRE of the antients. See NATRUM.

NIUCHE, a kingdom of chineſian Tartary, north of the province of Laotung.

NIVELLE, a town of the austrian Netherlands, and province of Brabant, fourteen miles south of Brussels.

NIVERNOIS. See the article NEVERS.

NIXABOUR, or NISABOUR, a city of Persia, in the province of Chorassan: east long. 57° 32', north lat. 35° 40'.

NOAH'S ARK, in scripture antiquity. See the article ARK.

NOAH'S ARK-SHELL, in natural history, a name given to several species of cardia, or heart-shells; being of an irregular oblong figure, and variously furrowed and striated. See the article CARDIA.

NOBILIARY, in literary history, a book containing the history of the noble families of a nation, or province: such are Chorier's Nobiliary of Dauphine,

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and Caumartin's Nobiliary of Provence. The Germans are said to be particularly careful of their nobiliaries, in order to keep up the purity of their families.

NOBILISSIMUS, MOST NOBLE, in roman antiquity, a title given to the princes of the imperial family, and which was bestowed on the Cæsars as early as the reign of Trajan; thus nobilis Cæsar, or N. C. that is nobilissimus Cæsar, is found on some of the antient medals. Tristram says, that the Cæsars bore the title of nobilissimi in all ages, but that the nobilissimate became a distinct independant dignity in the time of Constantine the Great.

NOBILITY, a quality that ennobles, and raises a person possessed of it above the rank of a commoner.

The origin of nobility in Europe is by some referred to the Goths; who, after they had seized a part of Europe, rewarded their captains with titles of honour, to distinguish them from the common people. In Britain the term nobility is restrained to degrees of dignity above knighthood: but every where else nobility and gentility are the same. The british nobility consists only of five degrees, viz. that of a duke, marquis, earl or count, viscount, and baron, each of which see under their proper articles. In Britain these titles are only conferred by the king, and that by patent, in virtue of which it becomes hereditary. The privileges of the nobility are very considerable, they are all esteemed the king's hereditary counsellors, and are privileged from all arrests, unless for treason, felony, breach of peace, condemnation in parliament, and contempt of the king. They enjoy their seats in the house of peers by descent, and no act of parliament can pass without their concurrence: they are the supreme court of judicature, and even in criminal cases give their verdict upon their honour, without being put to their oath. In their absence they are allowed a proxy to vote for them, and in all places of trust are permitted to constitute deputies, by reason of the necessity the law supposes them under of attending the king's person: but no peer is to go out of the kingdom without the king's leave, and when that is granted, he is to return with the king's writ, or forfeit goods and chattels. See *PARLIAMENT*, *PEER of the realm*, &c.

NOBLE, a money of account containing six shillings and eight-pence.

The noble was antiently a real coin

struck in the reign of Edward III. and then called the penny of gold; but it was afterwards called a rose-noble, from its being stamped with a rose: it was current at 6 s. 8 d.

NOCERA, a town of Italy, in the territory of the pope and dutchy of Spoleto, twenty miles north-east of Spoleto.

NOCERA DE PAGANI, a town of the kingdom of Naples, fifteen miles south of the city of Naples.

Terra **NOCERIANA**, EARTH OF NOCERA, in the materia medica, a species of bole, remarkably heavy, of a greyish-white colour, of an insipid taste, and generally with some particles in it which grit between the teeth. See *BOLE*.

It is much esteemed, by the Italians, as a remedy for venemous bites, and in fevers; but except its astringent quality, little dependence is to be had on the other virtues ascribed to it.

NOCTAMBULI, or **NOCTAMBULONES**, or **SOMNAMBULI**, NIGHTWALKERS, in medicine, a term applied to persons who have a habit of rising and walking about in their sleep. See *INCUBUS*.

This, according to Junker, is a very remarkable distemperature of the imagination, and in different persons differs greatly in degree. Those who are but moderately affected with it, only repeat their actions of the day, and getting out of their bed go quietly to the places they frequent at other times: but those who are afflicted with it in the most violent degree, go up to dangerous places, and do things that would terrify them to think of when awake. These are by some called lunatic nightwalkers, because fits are observed to return with more frequency and greater violence at the changes of the moon. The only material cause that can be assigned in this case is a plethora, or over-fulness of blood; but this is influenced by an immaterial one, that is by the fancy, which is busily employed in dreams about particular objects.

As to the method of cure, the same author observes, that the primæ viæ are first to be cleared of all their foulnesses by a strong purge; after this it is proper to bleed in the foot, taking away eight or ten ounces; then powders composed of cinnabar, nitre, and crab's eyes, should be taken three or four times a day; and particular regard should be had to the changes of the moon. It will be proper to set a vessel of water by the bedside, in such a manner that the person will naturally

rally step into it on getting out, and be awaked by that means; and if these things fail, a person should sit up to watch him, and beat him every time it happens.

NOCTANTUR, in law, a writ that issues out of the court of chancery, and is returnable in the king's bench; and lies where a person having a right to improve waste ground, erects a hedge or ditch, which is thrown down in the night-time, and it cannot be known by a jury by whom such damage was done: in that case if the neighbouring villages do not find out and indict the offenders, they shall be distrained to make good the same at their own costs, &c.

NOCTILUCA, in physiology, a species of phosphorus, so called because it shines in the night without any light being thrown upon it; such is the phosphorus made of urine. See **PHOSPHORUS**.

NOCTUA, a name applied to several different species of owls. See **OWL**.

NOCTURNAL, something relating to the night, in contradistinction to diurnal. See the article **DIURNAL**.

NOCTURNAL ARCH, in astronomy, the arch of a circle described by the sun, or a star, in the night. See **ARCH**.

Semi-NOCTURNAL arch of the sun, is that portion of a circle he passes over between the lower part of our meridian and the point of the horizon, wherein he arises; or between the point of the horizon wherein he sets, and the lower part of our meridian.

NOCTURNAL, **NOCTURLABIUM**, an instrument chiefly used at sea, to take the altitude or depression of some stars about the pole, in order to find the latitude and hour of the night.

Some nocturnals are hemispheres, or planispheres, on the plane of the equinoctial. These commonly in use among seamen are two; the one adapted to the polar star, and the first of the guards of the little bear; the other to the pole-star, and the pointers of the great bear.

This instrument consists of two circular plates (plate CLXXXVI. fig. 4.) applied to each other. The greater, which has a handle to hold the instrument, is about $2\frac{1}{2}$ inches diameter, and is divided into twelve parts, agreeing to the twelve months, and each month sub-divided into every fifth day; and so, as that the middle of the handle corresponds to that day of the year wherein the star here regarded has the same right ascension with the sun. If the instrument be fitted for

two stars, the handle is made moveable. The upper left circle is divided into twenty-four equal parts for the twenty-four hours of the day, and each hour sub-divided into quarters. These twenty-four hours are noted by twenty-four teeth to be told in the night. Those at the hours 12, are distinguished by their length. In the center of the two circular plates is adjusted a long index, A, moveable upon the upper plate. And the three pieces, viz. the two circles and index, are joined by a rivet which is pierced through the center with a hole, through which the star is to be observed.

To use the NOCTURNAL, turn the upper plate till the long tooth, marked 12, be against the day of the month on the under plate: then, bringing the instrument near the eye, suspend it by the handle with the plane nearly parallel to the equinoctial; and viewing the pole-star through the hole of the center, turn the index about till, by the edge coming from the center, you see the bright star or guard of the little bear (if the instrument be fitted to that star): then that tooth of the upper circle, under the edge of the index, is at the hour of the night on the edge of the hour circle: which may be known without a light, by counting the teeth from the longest, which is for the hour 12.

NODATED HYPERBOLA, a name given by Sir Isaac Newton, to a kind of hyperbola, which, by turning round, decussates or crosses itself. See **HYPERBOLA**.

NODE, *nodus*, in surgery, a tumour arising on the bones, and usually proceeding from some venereal cause; being much the same with what is otherwise called exostosis. See the article **EXOSTOSIS**.

This word is more particularly applied to the tumours or protuberances arising on the joints of old gouty people, called also topi. See the article **TOPHUS**.

Some give the denomination of nodes, to all tumours formed by a coagulation of viscous matter in the external parts of the body. See **TUMOUR**, &c.

NODES, in astronomy, the two points wherein the orbit of a planet intersects the ecliptic; such are the points C and D, pl. CLXXXVIII. fig. 1. n^o 1. whereof the node C, where the planet ascends northwards, above the plane of the ecliptic, is called the ascending node, the northward node, and the head of the dragon, and is marked thus ☿; the other node D, where the planet descends to the south, is called

called the descending node, the southward node, or the dragon's tail, marked thus 88. See the article DRAGON.

The line CD, wherein the two circles CE DF and CG DH intersect, is called the line of nodes. It appears from observation, that the line of the nodes of all the planets constantly changes its place, and shifts its situation from east to west, contrary to the order of the signs; and that the line of the moon's nodes, by a retrograde motion, finishes its circulation in the compass of 19 years; after which time, either of the nodes having receded from any point of the ecliptic, returns to the same again; and when the moon is in the node, she is also seen in the ecliptic. If the line of nodes were immoveable, that is, if it had no other motion than that whereby it is carried round the sun, it would always look to the same point of the ecliptic, or would keep parallel to itself, as the axis of the earth does. See EARTH and MOON.

From what has been said, it is evident, that the moon can never be observed precisely in the ecliptic, but twice in every period; that is, when she enters the nodes. When she is at her greatest distance from the nodes; viz. in the points E, F, she is said to be in her limits. See LIMIT.

The moon must be in or near one of the nodes, when there is an eclipse of the sun or moon. See ECLIPSE.

To make the foregoing account of the motion of the moon's nodes still clearer, let the plane of n^o 2. *ibid.* represent that of the ecliptic, S the sun, T the center of the earth, L the moon in her orbit DN.dn. Nn is the line of the nodes passing between the quadrature Q, and the moon's place L, in her last quarter. Let now LP, or any part LS, represent the excess of the sun's action at L, above his action at T; and this being resolved into the force LR, perpendicular to the plane of the moon's orbit; and PR parallel to it, it is the former only that has any effect to alter the position of the orbit, and in this it is wholly exerted. Its effect is twofold: 1. It diminishes its inclination by a motion which we may conceive as performed round the diameter Dd, to which LT is perpendicular. 2. Being compounded with the moon's tangential motion at L, it gives it an intermediate direction Lt, through which, and the center, a plane being drawn, must meet the ecliptic nearer the conjunction C, than before.

NODULE, or NODULUS, a word used in pharmacy, for a knot tied in a rag, and including some medicinal ingredients to be suspended in any liquor, as beer, or wine, to give it a tincture, or the like.

It signifies also a parcel of odoriferous simples, tied up in a piece of silk, for the patient to be frequently smelling to.

NODUS, or NODE, in dialling, a certain point or pole in the gnomon of a dial, by the shadow or light whereof, either the hour of the day in dials without furniture, or the parallels of the sun's declination, and his place in the ecliptic, &c. in dials with furniture, are shewn. See DIAL.

NODUS is also used for a hole in the ceiling of a room, or in the window, for making of a dial on the floor, wall, or the like.

NOERA, a word used by chemists, for the head of an alembic, or the cover of a cucurbite, or any other vessel used in distillation.

NOETIANS, in church-history, christian heretics in the III^d century, followers of Noetius, a philosopher of Ephesus, who pretended that he was another Moses, sent by God; and that his brother was a new Aaron. His heresy consisted in affirming that there was but one person in the Godhead; and that the Word and the Holy Spirit were but external denominations, given to God, in consequence of different operations; that as creator, he is called Father; as incarnate, Son; and as descending on the apostles, Holy Ghost.

NOGAIAN-TARTARS, a nation which inhabits that part of Circassia, in asiatic Turkey, that lies between the Palus Meotis and the Caspian sea.

NOGENT, a town of France, in the province of Champagne, situated on the river Seine, twenty-five miles north-west of Troyes.

NOLA, a town of Italy, in the kingdom of Naples, situated 16 miles east of Naples.

NOLI, a town of Italy in the territory of Genoa, situated on the bay of Genoa, thirty-five miles south-west of that city.

NOLI ME TANGERE, TOUCH ME NOT, in medicine, a malignant eruption in the face, occasioned by an extremely sharp corrosive humour; thus called, either because it affects those who touch it, or because the more it is touched, the worse it grows, and the farther it spreads.

NOLI ME TANGERE, among botanists, the SENSITIVE PLANT, the same with mimosa. See the article MIMOSA.

NOLLE

NOLLE PROSEQUI, in law. See the article **NON PROS**.

NOMADES, in antiquity, a name given to several nations or people, whose whole occupation was to feed their flocks, and who had no fixed place of abode, but were constantly shifting, according to the conveniencies of pasturage.

NOMANCY, a name given to the art of divining the fates of persons, by means of the letters that form their names; being nothing else but the cabbalistic gematria. See the article **CABBALA**.

NOMARCHA, in egyptian antiquity, the governor or commander of a nome. Egypt was antiently divided into several regions or quarters, called nomes.

NOMBRE DE DIOS, a town of Mexico, in the province of Darien, a little to the eastward of Porto Bello: west long. 83° , and north lat. 10° .

NOMBRIL POINT, in heraldry, is the next below the fess-point, or the very center of the escutcheon. See **POINT**. Supposing the escutcheon divided into two equal parts below the fess, the first of these divisions is the nombril, and the lower the base.

NOME, or **NAME**, in algebra, denotes any quantity with a sign prefixed or added to it, whereby it is connected with some other quantity, upon which the whole becomes a binomial, trinomial, or the like: thus $a + b$ is a binomial, $a + b + c$ is a trinomial, whose respective names or nomes are a and b for the first, and a , b , and c , for the second. See the article **BINOMIAL**, &c.

NOMENCLATOR, in roman antiquity, was usually a slave, who attended upon persons that stood candidates for offices, and prompted or suggested to them the names of all the citizens they met, that they might court them, and call them by their names; which, among that people, was the highest piece of civility.

NOMENCLATOIRES, among the botanical authors, are those who have employed their labours about settling and adjusting the right names, synonyms, and etymologies of names, in regard to the whole vegetable world.

NOMENCLATURE, *nomenclatura*, a catalogue of several of the more usual words in any language, with their significations, compiled in order to facilitate the use of such words, to those who are to learn the tongue: such are our latin, greek, french, &c. nomenclatures.

NOMENEY, a town of Germany, in the dutchy of Lorrain, situated on the river Seille, fifteen miles north of Nancy.

NOMINALS, or **NOMINALISTS**, a sect of school-philosophers, the disciples and followers of Occam, or Ocham, an english cordelier, in the XIVth century. They were great dealers in words, whence they were vulgarly denominated word-sellers; but had the denomination of nominalists, because that, in opposition to the realists, they maintained, that words, and not things, were the object of dialectics. See the article **REALISTS**.

The nominals, with the stoics, admit the formal conceptions or ideas of things, as the subject and foundation of universality; but to this they add names, which represent and signify, after the same univocal manner, and without any distinction, a great variety of single things, alike both in genus and species. See **STOICS**.

NOMINATION, the act of naming and appointing a person for some function, employ, or benefice.

NOMINATION, in law, signifies the power that a person has of appointing a clerk to a patron of a benefice, by him to be presented to the ordinary. This power or right of nomination a person may have by deed, whereby, if the patron refuses to have the person nominated, or instead thereof presents another, the nominator may bring a quare impedit. See **QUARE**, **NOMINATOR**, and **PATRON**.

NOMINATIVE, in grammar, the first case of nouns, which are declinable. See the articles **CASE** and **NOUN**.

The simple position or laying down of a noun, or name, is called the nominative case; yet it is not so properly a case, as the matter or ground whence the other cases are to be formed, by the several changes and inflections given to this first termination. Its chief use is to be placed in discourse before all verbs, as the subject of the proposition or affirmation.

NOMINATOR, he who presents a person to an office or benefice; whence the person named, or presented, is called nominee. See the article **NOMINATION**.

It is held, in the case of a benefice, that the person who has the nomination, is in effect the patron of the church, and the other is but an instrument to him that nominates; nevertheless, when a nominator does not appoint a clerk within six months after the avoidance, but the patron presents before the bishop has taken the

the advantage of the lapse, his clerk is to be admitted.

NOMOPHYLACES, Νομοφυλακες, among the Athenians, magistrates who were to see the laws executed, being not unlike to our sheriffs. They had the execution of criminals committed to their care, as also the charge of such as were confined prisoners. They had also power to seize thieves, kidnappers, and highwaymen, upon suspicion; and, if they confessed the fact, to put them to death; if not, they were obliged to prosecute them in a judicial way.

NONAGESIMAL, in astronomy, the 90th degree of the ecliptic, reckoned from the eastern term, or point. See the article **ECLIPTIC**, &c.

The altitude of the nonagesimal is equal to the angle of the east, and, if continued, passes through the poles of the ecliptic; whence the altitude of the nonagesimal, at a given time, under a given elevation of the pole, is easily found. If the altitude of the nonagesimal be subtracted from 90°, the remainder is the distance of the nonagesimal from the vertex.

NON-ABILITY, in law, incapacity, or an exception taken against a plaintiff, in a cause, on some just ground, why he cannot commence a suit in law; as his being attainted of felony, outlawry, &c.

NON-AGE, in law, generally signifies all the time a person continues under the age of one and twenty; but in a special sense it is all the time a person is under the age of fourteen. See **AGE**.

NON-APPEARANCE, a default in not appearing in a court of judicature. Attornies subscribing warrants for appearing in court, are liable to attachment and fine for non-appearance. If a defendant does not appear, and find bail upon a scire facias and rule given, judgment may be had against him.

NON-ASSUMPSIT, in law, is a general plea in a personal action, by which a man denies that he has made any promise.

NON-CAPE, in geography, a promontory on the west coast of Africa, opposite the Canary-islands.

NON-CLAIM, in law, signifies the omission of him who challenges not his right within the time limited by law, as within five years after a fine is levied, &c. by which neglect he is barred of his right.

NON COMPOS MENTIS, in law, is used to denote a person's not being of sound memory and understanding. Of these persons there are four different kinds, an

idiot, a madman, a lunatic who has lucid intervals, and a drunkard who deprives himself of reason by his own act and deed. In all these cases, except the last, one that is non compos mentis shall not lose his life for felony or murder; but the drunkard can have no indulgence on account of the loss of his reason, for, in the eye of the law, his drunkenness does not extenuate but aggravate his offence. See **IDIOT**, **LUNATIC**, &c.

NON DAMNIFICATUS, in law, is a plea to an action of debt, on a bond, the condition of which is only to save the plaintiff harmless.

NON DECIMANDO, a custom or prescription, by which a person is discharged from the payment of tythes.

NON DISTRINGENDO, in law, a writ granted in divers cases, not to distrain.

NON EST CULPABILIS, or **NON CUL**, in law, **NOT GUILTY**, the general plea to an indictment, or action of trespass, by which the defendant denies the crime or fact charged on him.

NON EST FACTUM, in law, is a plea where an action is brought upon a bond or other deed, and the defendant denies it to be his deed.

NON EST INVENTUS, is a sheriff's return to a writ, that the defendant is not to be found.

NON LIQUET, *it does not appear*; a verdict given by a jury, when a matter is to be deferred to another day of trial.

NON MOLESTANDO, a writ that lies for a person, molested contrary to the king's protection granted him.

NON-NATURALS, in medicine, so called because by their abuse they become the causes of diseases. See **DISEASE**.

Physicians have divided the non-naturals into six classes, *viz.* the air, meats and drinks, sleep and watching, motion and rest, the passions of the mind, the retentions and excretions. See **AIR**, &c.

NON OBSTANTE, **NOTWITHSTANDING**, a clause frequent in statutes and letters patent, importing a licence from the king to do a thing, which at common law might be lawfully done, but being restrained by act of parliament, cannot be done without such licence.

NON OMITTAS, a writ that lies where the sheriff returns, upon a writ or process directed to him, that he has sent to the bailiff of the franchise, who has the return of writs, and that he neglects to serve the writs sent him; upon which the sheriff is commanded to enter into such franchise

franchise himself, and there to execute the king's process.

NON PLEVIN, a default in not replevying of land in due time.

NON PONENDO IN ASSISIS ET JURATIS, a writ which lies for freeing a person from serving on assizes and juries: where a person is exempted by charter, &c. he may sue the sheriff for returning him.

NON PROCEDENDO AD ASSISAM REGE INCONSULTO, is a writ granted for stopping the trial of a cause appertaining to a person who is in the king's service, till his majesty's pleasure be further known.

NON PROS, or **NOLLE PROSEQUI**, is where a plaintiff in an action does not declare in a reasonable time; in which case it is usual for the defendant's attorney to enter a rule for the plaintiff, to declare, after which a non pros may be entered. A nolle prosequi is esteemed a voluntary confession, that the plaintiff has no cause of action; and therefore if a plaintiff enter his nolle prosequi, he shall be amerced; and if an informer cause the same to be entered, the defendant shall have costs.

NON RESIDENCE is particularly applied to spiritual persons, who wilfully absent themselves for the space of one month together, or two months at different times in the year, from their benefices; for which they are liable to penalties, by the statute of non residence: but bishops, the king's chaplains, &c. are excepted.

NON RESIDENTIA PRO CLERICIS REGIS, is a writ directed to the bishop, charging him not to molest a clerk employed in the king's service, on account of his non residence.

NON SANE MEMORIÆ, is an exception taken to an act, declared to be done by another, importing, that it was done at a time when the party was not in his right senses.

NON-SUIT, signifies the dropping of a suit or action, or a renouncing thereof by the plaintiff or defendant, which happens most commonly upon the discovery of some error in the plaintiff's proceedings, when the cause is so far proceeded in, that the jury is ready at the bar to deliver in their verdict.

A non-suit, it is said, may be in the following cases, viz. where a person brings a personal action, and does not prosecute it with effect; or if, upon the trial, he refuses to stand a verdict, then he becomes non-suited; so where the plaintiff is not ready for trial at the call-

ing and swearing of the jury, it is presumed he does not stand to proceed in his cause, and on that account the court may call him non-suited. Likewise, on a trial, when the jury comes in to deliver their verdict, and when the plaintiff is called on, to hear the same, in that case, if he does not appear after being thrice called by the crier of the court, he is non-suited; which non-suit is to be recorded by the secondary, by the direction of the court: but if he afterwards appears, before the non-suit is actually recorded, the court may take the verdict, for that is not a non-suit, till it be recorded, upon motion made by the counsel for this purpose; and then it is a part of the record, in the nature of a judgment against the plaintiff.

NON SUM INFORMATUS, *I am not informed*, a formal answer made by an attorney, who is not instructed what to say in his client's behalf; on which he is deemed to leave the cause undefended, and therefore judgment passes against his client.

NON-TENURE, is a plea in bar to a real action, by which the tenant insists, that he does not hold the lands, &c. mentioned in the plaintiff's count, or at least some part of it.

NON-TERM, the time of vacation between term and term, which was formerly called the days of the king's peace.

NONÆ ET DECIMÆ, were payments formerly made to the clergy, by tenants of church-farms: in which case nonæ signified a duty paid for things belonging to husbandry: and decimæ, or tithes, were claimed in right of the church.

NONCONFORMISTS, the same with dissenters. See the article **DISSENTERS**.

NONE, one of the seven canonical hours in the romish church, answering to three o'clock in the afternoon.

NONES, *nonæ*, in the roman calendar, the fifth day of the months January, February, April, June, August, September, November, and December; and the seventh of March, May, July, and October. March, May, July, and October, had six days in their nones; because these alone, in the antient constitution of the year by Numa, had thirty-one days a-piece, the rest having only twenty-nine, and February thirty: but when Cæsar reformed the year, and made other months contain thirty-one days, he did not allot them six days of nones.

NOOSE, a name given by sportsmen to a fort

fort of horse-hair springe, made to take woodcocks, and very successful when the proper precautions are taken. The noose is made of several long and strong hairs twisted together, with a running noose at one end, and a large knot at the other, which is to be passed through the slit of a cleft stick, to prevent the noose from being pulled away when the bird is caught in it.

NORCIA, a town of Italy, in the territory of the pope, twenty-eight miles east of Spoleto.

NORDEN, a port town of Germany, in the circle of Westphalia, and county of Embden, twelve miles north of Embden.

NORFOLK, a county of England, bounded by the German sea on the north and east; by Suffolk on the south, and by the fens of Lincolnshire and the isle of Ely on the west.

NORFOLK, a county of Virginia, north of Carolina, and contiguous to that province.

NORKOPPING, a town of Sweden, in the province of East-Gothland, ninety miles south-west of Stockholm.

NORMAL, in geometry, signifies the same with a perpendicular, and is used for a line or plane that intersects another perpendicularly. See **PERPENDICULAR**, **SUBNORMAL**, **LINE** and **PLANE**.

NORMANDY, a province of France, bounded by the east channel on the north, by Picardy and the Isle of France on the west, by Orleanois on the south, by Brittany and another part of the East channel on the west.

NORROY, the title of the third of the three kings at arms. See **HERALD**.

NORTGON, the palatinate of Bavaria, so called.

NORTH, in cosmography, one of the four cardinal points. See **COMPASS**.

NORTH-CAPE, a promontory of the island of Maggero, in the province of Wardhuys, in the north of Norway; it being the most northern cape in Europe: east long. 21° , and north lat. 72° .

NORTH-CURRY, a market-town of Somersetshire, seventeen miles south-west of Wells.

NORTH-FORELAND, a cape in the isle of Thanet, on the east coast of Kent, four miles east of Margate.

NORTH-RIVER, a great river which rises in Mexico, and discharges itself into the gulph of Mexico, in 26° north lat.

NORTH-SEA, a name given to all that part

of the Atlantic Ocean, which lies north of Terra Firma, in South America.

NORTH-WEST passage. A north-west passage by Hudson's Bay, into the pacific ocean, has been more than once attempted of late years, but, hitherto, without success. Some greatly doubt of the practicableness of such an enterprize, and think the observations made by the Russians give us small hopes. But, as they have not yet published the particulars of their discoveries, little can be said about them. Some general things may be seen in the Phil. Trans. N^o 482. sect. 14. It appears from thence, that the Russians have passed between the land of Nova Zembla, and the coast of Asia; and, as the Dutch did formerly discover the northern coasts of Nova Zembla, we may now be well assured, that that country is really an island.

NORTHALLERTON, a borough-town of the north riding of Yorkshire, twenty-two miles north-west of York.

It sends two members to parliament.

NORTHAMPTON, the capital of Northamptonshire, situated on the river Nen: west long. $55'$, and north lat. $52^{\circ} 15'$.

It sends two members to parliament.

NORTHAMPTON is also a county of Virginia, in North America, which forms the south part of the peninsula on the eastern shore of Virginia.

NORTHAUSEN, a town of Germany, in the circle of Upper Saxony, and territory of Thuringia, fifty-five miles south-west of Magdeburg.

NORTHEIM, a town of the dutchy of Brunswic, in Lower Saxony, forty-five miles south of Hanover.

NORTHING, in navigation, the latitude made by a ship, in sailing towards the north-pole.

NORTHLEECH, a market-town of Gloucestershire, fifteen miles east of Gloucester.

NORTHUMBERLAND, a county of England, bounded on the north by Scotland, on the east by the German sea, on the south by Durham, and on the west by Cumberland and part of Scotland.

NORTHUMBERLAND is also a county of Virginia, lying at the mouth of the river Patowmac.

NORTHWICH, a market-town of Cheshire, sixteen miles north-east of Chester.

NORWAY, a kingdom of Europe, situated between 4° and 30° east longitude, and between 58° and 72° north latitude, bounded by the Atlantic Ocean on the north

north and west, by Swedish Lapland and other provinces of Sweden on the east, and by the sea called the Categate and Schaggerac on the south. It is a cold barren country subject to Denmark.

NORWAY-RAT, *mus norvegicus*, in zoology, an animal of the mus-kind, variegated with black and tawney. It resembles the common rat in shape, but its tail is shorter. It breeds in the mountains of Norway, but at times comes down into the low country in vast troops, which destroy all the vegetable produce, and afterwards dying upon the place, leave a stench that occasions pestilential fevers. See the article *Mus*.

NORWICH, a large city of great trade in Norfolk, situated twenty miles west of Yarmouth and the German ocean: east long. $1^{\circ} 26'$, and north lat. $52^{\circ} 40'$.

It sends two members to parliament.

NOSE, *nasus*, in anatomy, the primary organ of smelling. This varies greatly in size and figure in different subjects: anatomists divide its parts into external and internal; those most obvious are the dorsum or ridge, which runs along its whole length, one part of which is more prominent than the rest, and called the spine; the orbiculus, or extreme part, which in many is turned round; the alæ or pinnæ, which are the sides; and the septum, which divides the nose into two parts, called nares or nostrils; the hairs also are of this number; these serve to hinder the mucus of the nostrils from continually running out, and to prevent insects and extraneous substances of many kinds from getting in. To these may be added the common teguments, *viz.* the epidermis, the fat, and the cutis. The upper part of the nose is rigid, and composed of bones; the lower part is composed of a number of cartilages, muscles, and membranes.

The internal parts of the nose are, the bones; as the ossa nasi, the maxillaria, the os cribriforme, the ossa spongiosa, the os frontale, the lachrymalia, the os palati, the vomer, and the os sphenoides. The cartilages, which form the lower part, are connected by membranes, in order to render it flexible; the first of these form the anterior part of the septum narium; there are two very large and conspicuous ones in each of the alæ, and between these there are placed sometimes two, sometimes three, and sometimes more smaller ones: the septum narium is cartilaginous in its anterior and lower part; in its posterior and upper, it is bo-

ney: and these parts are surrounded by robust and strong membranes, which join them firmly together.

There are two passages from the nostrils into the mouth, destined for the passage of air and of the mucous matter: there are sinuses in the maxillary, frontal, and sphenoidal bones; and cellulæ in the os ethmoides, which increase the hollow of the nose, and thus give room for the greater expansion of the pituitary membrane. There are also certain inequalities and eminences of the ossa turbinata or ossa spongiosa of the nostrils, which serve partly the same purposes, and partly to prevent insects and other extraneous matter, and even the cold air, from getting immediately that way into the mouth. There is likewise a soft and vascular membrane, which invests the nostrils, and all the sinuses and irregularities; this is called the membrana mucosa, and pituitaria of Schneider, and is the primary organ of smelling, and the place of secretion of the mucus of the nostrils. The openings of the excretory ducts of this membrane are extremely conspicuous in the head of an ox. There are also a number of little glands under this membrane, especially about the middle of the septum, which are destined to the secretion of a mucous humour, like that of the rest of the glands of this part.

The arteries, which are dispersed in prodigious numbers through this membrane, arise from the carotids; these also serve for the secretion of this mucus. The veins are from the jugulars, by which the abundant blood not employed for these purposes, is returned. The nerves dispersed through the membrana pituitaria, are, 1. The olfactorii, or olfactory nerves; which are supposed to be of use in smelling, and are sufficiently observable, tho' they are less in human subjects than in quadrupeds. And, 2. Some branches of the fifth pair, which terminate in the hairs, and constitute the true organ of smelling.

Under the membrana pituitaria, there is also another very thin membrane, which serves to invest the bones and cartilages; this, where it surrounds the former, is called periosteum; where the latter, perichondrium. The foramina in the nostrils are, 1. Those at the frontal, the maxillary, and the sphenoidal sinuses, and the cellulæ of the os ethmoides, serving for the communication of these sinuses with the nostrils. 2. The orifices of the lachrymal ducts, which open into the nostrils.

And, 3. The ducts from the nose into the mouth; these, in a skeleton, are open and are obvious just behind the dentes incisores of the upper jaw; but in the dissection of recent bodies, they are not found absolutely to open into the mouth at all, nor indeed do they in living subjects, for they are closed up by the membrane of the palate.

The uses of the nose are, its giving us the sense of smelling; its serving in the great office of respiration, and in modelling the voice; in receiving the abundant humours from the eyes, and in adding to the beauty of the face. It is certain, that there is no passage to the brain for the air, much less for the powders snuffed up the nostrils: and whether there be any for transmitting a mucous humour from the brain, in order to its being discharged at the nostrils, as the ancients, and as Schellvogtius, and some other of the moderns, have supposed, is not yet ascertained. See the article NOSTRILS.

Wounds of the Nose. These are generally cured by the dry suture; but where the wound divides the cartilage, and penetrates so deep, that its lips cannot be kept in contact, by the application of sticking plasters, the true suture must be made through the skin, on each side of the wound. Though it sounds very unlike truth, that any part of the nose should be entirely separated from the rest, and afterwards united to it again, by means of sutures; yet Roonhuys, in his *Observ. Chirurg.* xxiv. gives an instance of a nose slit down longitudinally, and cured by suture. M. Blegny, in *Zod. Med. Gall.* speaks of a soldier, whose nose was cut off by a scymeter, and afterwards sewed on again so well by the surgeon, that the scar could scarcely be perceived; and M. Garengot, in tom. iii. p. 55. of his *Surgery*, gives an account of a nose that was conjoined again by suture, after it was bit off. When the nasal bones are fractured, it is usual to place small tubes, of silver or lead, under them, for some time, to prevent the passage of the nose being stopped by the shooting out of the new flesh. Externally, some vulnerary balsam or glutinous powder is to be used, and covered with sticking plasters, which must be kept on with the four-headed bandage.

When this member is absolutely lost, we must supply its defects with an artificial nose of wood, or silver: such an artificial nose, painted to the life and adapted by

proper springs and screws, may render the accident and deformity imperceptible.

Fracture of the Nose. In the nose, both the bone and cartilages are subject to fractures; and if the injury is very great, they can never be so perfectly cured, but that some deformity will remain; besides, the vicinity of this part to the brain, which is frequently injured at the same time, renders cases of this kind often dangerous: a caries also, or a polypus, are no uncommon attendants on this disorder. In order to restore the bones of the nose to their proper situation, the patient is to be placed in a seat opposite to the light, and his head is to be held back, while the surgeon raises the depressed part with a spatula, a probe, or a quill, applying externally the thumb of one hand, and the fore-finger of the other. If the bones are fractured on both sides, they are to be raised on each in this manner, and the cavity of the nostrils is to be filled up with long dossils, to prevent the bones from collapsing; covering the part also, for this end, with a plaster, applying first the dressings common to recent wounds. If the bone be fractured into several splinters, they are to be reduced into their proper places, by the fingers; but if a splinter is so entirely separated from the bone, that it will not easily unite with it again, it is to be taken out with the forceps. If no caries or abscess intervene, the bones will unite in about fourteen days. If the bone should require a stronger support than what has hitherto been mentioned, one may be formed out of strong paper, either single or double, adapted to each side of the nose, and supported by bolsters, and the whole must be kept in its place by a four-headed bandage, not tied too tight. When the fracture of this part is accompanied with an external wound, after the bones are replaced, dress the wound first with dry lint, covering it with a vulnerary plaster, afterwards use balsamic medicines; but all those that are oily or greasy, are to be carefully avoided, both here, and in all other cases where the bones are injured.

Luxation of the Nose. When the bones are separated from each other, or distorted out of their places, they are to be replaced by a probe, or quill, thrust up the nostrils, guiding the parts thus raised up, with the other hand, into their proper places, as above described, under *Fractures*; after which there is scarce

any thing to be done, but to let a piece of sticking plaster lie upon the nose for some time.

Another disorder to which the nose is liable, is that of the preternatural closing of the nostrils, which is sometimes owing to careless treatment in the small-pox, in the bad sort of which the nostrils have been known to close, and adhere so strongly to the upper lip, which is turned back at the same time, as to leave no possibility of shutting the mouth. In this unhappy case, the only relief is by the knife, separating the lip from the nose, and then opening a passage through each of the nostrils, which are to be kept open with leaden pipes, and the lip pressed down into its natural position by a compress and bandage, and this continued till the wounds are cicatrized.

For the polypus and ulcer in the nose, see the articles POLYPUS and OZÆNA.

Bleeding at the NOSE. See HÆMORRHAGE.

NOSTRILS, *Nares*, in anatomy, the two apertures or cavities of the nose, through which the air passes, and which serve to convey odours, and to carry off the pituita separated in the sinuses of the base of the cranium. See the article NOSE.

NOT GUILTY, *non est culpabilis*, in law. See the article NON EST, &c.

NOTABILIA BONA, in law. See BONA.

NOTARICON, the third part of the jewish cabbala. See the article CABBALA.

NOTARY, *notarius*, signifies a person, usually some scrivener, who takes notes, or frames short draughts, of contracts, obligations, charter-parties, or other writings. At present we call him a notary-public, who publicly attests deeds, or writings, in order to make them authentic in another nation: but he is principally employed in business concerning merchants, as making protests of bills of exchange, &c. And noting a bill, is where he goes to take notice of a merchant's refusal to accept or pay the same. See the article BILL.

The learned civilian Domat observes, that a distinction between a voluntary and contentious jurisdiction obliges us to take notice of a particular kind of officers, whose functions are of a very great and very frequent use, and who have a kind of voluntary jurisdiction, without any share of the contentious jurisdiction, which are the public notaries: for the functions of notaries imply two characters of a voluntary jurisdiction; the first consists in this, that their presence and their

signature serve as a proof of the truth of the acts which are sued in their presence; and that whereas in the writings which are called private, that is to say, which are signed only by the parties, their signatures being unknown in courts of justice, it is necessary to verify them, if they are called in question: the signatures of notaries, who are public officers, carry along with them the truth of the acts which they sign. And the second of these characters consists in this, that the acts which contain some obligations of one party towards another, being signed by a notary public, gives a right of mortgage on the estate of the person who is bound, which a private bond or obligation signed only by the party would not give.

Ecclesiastical NOTARIES, were officers in the first ages of the church, whose business it was to collect and preserve the acts of martyrs.

NOTATION, in arithmetic and algebra, the method of expressing numbers or quantities by signs or characters, appropriated for that purpose. See NUMERATION, ALGEBRA, CHARACTER, &c. There is one thing which deserves particular notice, in regard to this subject, and that is, the great advantages that may redound to science, by a happy notation, or expression of our thoughts. It is owing entirely to this, and the method of denoting the several combinations of numbers, by figures standing in different places, that the most complicated operations in arithmetic, are managed with so much ease and dispatch. Nor is it less apparent, that the discoveries made by algebra are wholly to be imputed to that symbolical language made use of in it: for by this means we are enabled to represent things in the form of equations; and by variously proceeding with these equations, to trace out, step by step, the several particulars we want to know. Add to all this, that by such a notation, the eyes and imagination are also made subservient to the discovery of truth; for the thoughts of the mind rise up and disappear, according as we set ourselves to call them into view; and therefore, without some particular method of fixing and ascertaining them as they occur, the retrieving them when out of sight would be no less painful, than the very first exercise of deducing them one from another. As, therefore, we have, frequent occasion to look back upon the discoveries

already made, could these be no otherwise brought into view, than by the same course of thinking in which they were first traced, so many different attentions at once must needs greatly distract the mind, and be attended with infinite trouble and fatigue. But now, the method of fixing and ascertaining our thoughts by a happy and well chosen notation, entirely removes all those obstacles; for thus, when we have occasion to turn to any former discovery, as care is taken all along to delineate them in proper characters, we need only cast our eye on that part of the process where they stand expressed, which will lay them at once open to the mind in their true and genuine form. By this means we can take, at any time, a quick and ready survey of our progress, and running over the several conclusions already gained, see more distinctly what helps they furnish towards obtaining those others we are still in pursuit of. Nay, farther, as the amount of every step of the investigation lies before us, by comparing them variously among themselves, and adjusting them one to another, we come at length to discern the result of the whole, and are enabled to form our several discoveries into an uniform and well-connected system of truths, which is the end and aim of all our inquiries.

NOTE, *nota*, is used for a character or abbreviature, serving to denote or express something in a little compass.

NOTES, in music, characters which mark the sounds; *i. e.* the elevations and fallings of the voice, and the swiftness and slowness of its motions. In general, under notes are comprehended all the signs or characters used in music, though in propriety the word only implies the marks which denote the degrees of gravity and acuteness to be given to each sound. See **SOUND**, **CHARACTER**, and **GRAVITY**. The Greeks used the common letters of their alphabet for musical notes, and in regard more notes were needed than they had letters, the defect was supplied by the different situation of the letters: thus the same letter Π expressed different notes in all the following forms Π , Π , Π , Π , Γ , Π . For every several mode they had eighteen signs. Now Alypius gives us signs for fifteen different modes, which, with the differences of the genera, and the distinction between voice and instrument, Mr. Malcolm makes 1620 notes. Not that they had so many distinct cha-

raacters, but the same characters had different significations upon different occasions, as ϕ in the diatonic genus is lychanos hypaton of the lydian mode, and hypate meson of the phrygian, and so of others.

The Latins, in the time of Boëthius, had eased themselves of this needless burden, and only used fifteen letters of their alphabet for notes. These, pope Gregory, considering that the second octave was in effect the same with the first, and that the order was the same in the upper and lower octave of the gamut, afterwards reduced to seven, which were to be repeated in a different character: at length, in the eleventh century, Guido Aretine, a benedictine monk, instead of the letters substituted six syllables, *ut, re, mi, fa, sol, la*, placing them in different lines, and marking them with points. Lastly, it was thought proper to add notes likewise in the spaces. See the article **GAMUT**.

Hitherto the notes only served to express the degrees of tune: they were all of equal value as to time, till about the year 1330, when John De Muris, doctor of Paris, gave different figures to different points, to express the quantity of time each was to be dwelt upon. See **TIME**. There are three things to be considered in these notes, 1. The quantity, *i. e.* the size and figure of the head. 2. The quality, *i. e.* the colour of the head, whether it be white or black, full or open. 3. The properties, as the Italians express themselves, *viz.* whether the note is accompanied with a virgula or comma, or not. It must likewise be considered whether the notes be separate and distinct, or bound together. Each of these, *viz.* the quantity, quality, &c. may be seen under the articles **MINIM**, **CROTCHET**, &c.

Mathematicians compute that one may make 720 changes or varieties with six notes, without ever repeating the same twice; and that of the notes of each octave, one may make 40320 different tunes or songs. See the article **TUNE**.

NOTE is likewise used for a mark made in a book or writing where there occurs something remarkable and worthy of particular notice: as also for an observation or explication of some passage in an author added in the margin, at the bottom of the page, or elsewhere, by an editor, in which sense it stands contradistinguished to text. The notes make the principal difference in the editions of classic,

&c. authors. We have Virgil, Horace, Terence, *&c.* with Dacier's notes, Dauphin's notes, notes variorum, *&c.*

NOTE is also a minute, or short writing, containing some article of business, in which sense we say, promissary note, note of hand, bank note, *&c.*

To NOTE a bill. See the articles **NOTARY**, **PROTEST**, and **BILL**.

NOTE of a fine, in law, an abstract of the fine or contract made by the chirographer, before the same is engrossed.

NOTHÆ CASTÆ, in anatomy, the five lowest ribs on each side. They are called bastard or spurious ribs, in regard they do not join with the breast-bone as the other ribs do; nor are they, like the rest, bony, but cartilaginous. See **RIBS**.

NOTHING, *nihil*. The schoolmen distinguish between nothing taken strictly, being that which is impossible, or implies a contradiction; and nothing taken more generally, being applied both to what is possible and impossible. Again, they distinguish nothing into negative, which is the absence of reality in any subject; and privative, which is the absence of reality in a subject capable thereof, or wherein it ought to be found.

NOTHUS, *νοθος*, signifies spurious or bastard, whence it is figuratively applied by physicians, *&c.* to such diseases, as though in respect of a similitude of symptoms, *&c.* they have the same denomination as some others, yet are of a different origin, seat, or the like, from the same.

NOTICE, in law, is defined to be the making of something known, which a man might be ignorant of before: and it has divers effects in our law; for thereby the party giving the same, may reap a benefit which he otherwise should not have had; and by this means the person to whom it is given, is liable to some charge or action to which without it he had not been subject. Notice is in several respects required to be given in order to justify proceedings; yet none is bound by law to give notice to another of what such other may inform himself. In the case of a promise, it has been held, that where a penalty is to be recovered, there notice is necessary; but where the plaintiff sues for damages, the defendant has sufficient notice, by the action brought against him. Likewise, if a person is obliged by an assumpsit in general to do a certain thing to another, the person to whom the promise is made must give

notice when he would have him perform it; and yet where another person is to do it, in such case, he to whom the thing is to be done shall not be compelled to give notice to that third person, as to the doing thereof: but the party must at his peril procure it. Where one enters into a bond to make such an assurance as the counsel of the obligee shall advise, the obligor is to have notice that the obligee's counsel has advised the same. If a thing lies in the knowledge of the plaintiff in an action, there ought to be notice given of it to the defendant. Upon all writs of inquiry of damages, either in real or personal actions, notice must be given to the other party in the suit; and want of notice on divers occasions, is often the cause of arrest of judgment, *&c.*

NOTION, in logic, an idea or representation of any thing in the mind. See the article **IDEA**.

This term, and the word idea, are often taken in the same sense; but the ingenious bishop Berkeley observes, that we cannot strictly be said to have an idea of an active being, or of an action, although we may be said to have a notion of them. I have, says he, some knowledge or notion of my mind, and its acts about ideas, inasmuch as I know or understand what is meant by these words. What I know, that I have some notion of. However, continues our author, if the world will have it so, the terms idea and notion may be used convertibly. By yet it conduces to clearness and propriety that we distinguish things very different by different names. It is also to be remarked, that in all relations including an act of the mind we cannot so properly be said to have an idea, but rather a notion of the relation or habitudes between things: but if in the modern way the word idea is extended to spirits, relations, and acts, this is after all an affair of a verbal concern.

It is an established opinion among some philosophers, that there are in the understanding certain innate principles, some primary or common notions, *νοηματα*, as it were stamp'd upon the mind of man, and which the soul receives in its very first being, and brings into the world with it. But this opinion is accurately discussed, and refuted by Mr. Locke, who shews how men, barely by the use of their natural faculties, may attain to all the knowledge they have, without any such original notions or principles.

principles. See **IDEA** and **KNOWLEDGE**.
NOTITIA, in literary history, a book that gives an account of a particular country, city, or other place: such is the *Notitia Imperii Romani*, *Notitia Romæ Antiquæ*, &c.

NOTO, the capital of a province of the same name, in Sicily, twenty miles south of Syracuse: east long. 15° , north lat. $37^{\circ} 15'$.

NOTONECTA, the **BOAT-FLY**, in the history of insects, a genus of insects of the class of the *scleroptera*, the rostrum or snout of which is inflected, the antennæ are very short; the wings, which are four in number, are cruciated, and the legs are formed for swimming.

NOTORIOUS, something that is publicly known, and therefore needs no proof.

NOTRE DAME, OUR LADY, an appellation frequently given to the Holy Virgin: and hence we meet with churches of *notre dame*, as that at Paris; also feasts, nunneries, &c. of *notre dame*.

NOTTEBURG, a city of Russia, situated on an island in the lake Lodoga, twenty-five miles east of Petersburg.

NOTTINGHAM, the capital of Nottinghamshire, situated about a mile north of the river Trent: west longitude $1^{\circ} 5'$, north latitude 53° .

It sends two members to parliament.

NOVA, NEW, something opposed to old. Hence,

NEVA-SCOTIA, New SCOTLAND. See the article **SCOTLAND**.

NOVA-ZEMBLA, or Newland, called by the Dutch the island of Weygats, is situated in the frozen ocean, between 50° and 80° east longitude, and between 70° north latitude and the north pole; it is separated from the province of Samoiëda, in Russia, by the straits of Weygats; but whether it be an island, or part of some great continent, is uncertain, no ships having ever passed to the northward of it.

NOVALE, in our antient customs, signifies land newly ploughed, that had not been tilled before in the memory of man. *Novale* is also sometimes used for fallow land.

NOVARA, the capital of the Novarese, in the dutchy of Milan, forty miles west of Milan.

NOVATIANS, a christian sect which sprang up in the third century, so called from Novatian, a priest of Rome, or Novatus, an african bishop, who separated

from the communion of pope Cornelius, whom Novatian charged with a criminal lenity towards those who had apostatized during the persecution of Decius. He denied the church's power of remitting mortal sins, upon the offender's repentance; and at last went so far as to deny that the apostles could ever hope for pardon even from God himself. Novatus coming to Rome, joined with the followers of Novatian, and added to these rigid doctrines another, which was the unlawfulness of second marriages, against which this became as severe as against apostates; denying communication to such as married a second time after baptism, and treating widows who married again, as adulteresses. The two leaders were proscribed and declared heretics, not for excluding penitents from communion, but for denying that the church had the power of remitting sins.

NOVATION, or INNOVATION, in the civil law, denotes the change of one kind of obligation for another; as when a promise is accepted instead of a written obligation. See the article **OBLIGATION**.

NOVEL, in the civil law, a term used for the constitutions of several emperors, as of Justin, Tiberius, Leo, and more particularly of those of Justinian. The constitutions of Justinian were called novels, either from their producing a great alteration in the face of the antient law, or because they were made on new cases, and after the revival of the antient code, compiled by order of that emperor. Thus the constitutions of the emperors Theodosius, Valentinian, Marcian, &c. were also called novels, on account of their being published after the theodosian code.

NOVEL, in matters of literature, a fictitious history of a series of surprizing and entertaining events in common life, wherein the rules of probability are or ought to be strictly preserved; in which it differs from a romance, where the hero and heroine is some prince and princess, and the events which lead to the catastrophe, are in general highly absurd and unnatural. The best novels are those which by means of a well told story, convey a number of noble and elevated sentiments, and instruct the reader in the knowledge of mankind.

NOVEL ASSIGNMENT, in law, an assignment of time, place, or the like, in an action of trespass, otherwise than it was before assigned.

This

This is practised, where an action of trespass being brought for breaking a close, generally; and the defendant, in his plea, justifies himself in a place where no trespass was committed; in which case, the plaintiff assigns the close, or place where the trespass was done, and to this the defendant must plead.

NOVEL DISSEISIN. See the article ASSISE of *novel disseisin*.

NOVELLARA, a town of Italy, in the dutchy of Mantua; twenty miles south of the city of Mantua.

NOVEMBER, in chronology, the eleventh month of the julian year, consisting only of thirty days: it got the name of November, as being the ninth month of Romulus's year, which began with March. See the articles MONTH and YEAR.

NOVEMSILES, or NOVENSILES DII, in roman antiquity, certain gods brought to Rome by the Sabines, and so called as being nine in number, *viz.* Lara, Vesta, Minerva, Feronia, Concord, Fidelity, Fortune, Chance, Health.

Some understand, by novensiles dii, new created gods, or those whose worship was brought from some foreign country to Rome; whilst others pretend, they signified the nine muses.

NOVEMVIRI, the nine magistrates of Athens, more usually called archons. See the article ARCHON.

NOVENDIALE, or NOVEMDIALE, a nine-days solemnity, observed with sacrifices by the antient Romans, to divert the mischiefs with which they were threatened with prodigies, and to appease the anger of the gods.

NOVI, a town of Italy, twenty-five miles north-west of Genoa.

NOVIBAZAR, a city of european Turkey, in the province of Servia, 100 miles south of Belgrade: east long. 22°, north lat. 43° 30'.

NOVICE, in general, denotes a person not yet skilled, or experienced, in any art or profession.

In the countries where monachism prevails, novices are the candidates, or probationers, for a religious life. See the article MONK.

This noviciate lasts a year, at least; in some monasteries more; after which the novices, by professing themselves and taking the vows, become dead to the world in a civil sense.

NOVIGRAD, a town of Hungary, sixteen miles north of Buda, in 19° 5' east

longitude, and 48° north latitude.

NOVIGRAD is also a town of Dalmatia, in 17° 30' east longitude, and 44° 30' north latitude.

NOUN, *nomen*, in grammar, a part of speech, which signifies things without any relation to time; as a man, a house, sweet, bitter, &c.

The words which signify the simple objects of our thoughts are, in all languages but the English, called names: but our first formers of grammar, either out of affectation or folly, corrupted the latin word *nomen*, into the barbarous sound *noun*, as it is called in the vulgar grammars. And thus they have made a division of names, calling the name of a thing or substance, a noun-substantive; and that which signifies the manner or quality, a noun-adjective. See NAME, SUBSTANTIVE, and ADJECTIVE.

Nouns are also divided into proper and appellative. See the articles PROPER and APPELLATIVE.

NOVOGOROD, the capital of a province of the same name in Muscovy, situated on the river Wolcuff, 130 miles south-east of Petersburg: east long. 34°, north lat. 58°.

It is an archbishop's see, and has 180 churches and monasteries.

NOVOGRODECK, a city of Lithuania, in Poland: east long. 25° 30', north lat. 53° 45'.

NOURISHMENT, or NUTRITION, in physiology. See NUTRITION.

NOWED, in heraldry, signifies knotted, from the latin *nodatus*; being applied to the tails of such creatures as are very long, and sometimes represented in coat-armour, as if tied up in a knot.

NOYA, a town of Galicia, in Spain, situated in the river Tamara, fifteen miles west of Compstella.

NOYON, a town of the isle of France, fifty miles north-east of Paris.

NUBECULA, in surgery and medicine, a distemper of the eye, otherwise called leucoma. See the article LEUCOMA.

NUBECULA is also used for a matter in form of a cloud suspended in the middle of the urine. See the article URINE.

NUBIA, a country of Africa, bounded by the desert of Barca, on the north; by Egypt and Abyssinia, on the east; by the Lower Ethiopia, on the south; and by the deserts of Africa, on the west.

NUBILES ANNI, the legal age of marriage. See the article MARRIAGE.

NUCHA

NUCHA, in anatomy, the nape of the neck.

See the article **NECK**.

NUCIFEROUS TREES, such as bear nuts.

See the articles **TREE** and **NUT**.

NUCIFRAGA, in ornithology, a bird otherwise called *coccothraustes*. See the article **COCCOTHRAUSTES**.

NUCKIANÆ GLANDULÆ, in anatomy, a number of small glands, situated between the abducent muscle of the eye, and the upper part of the os jugale. See the articles **EYE**, **GLAND**, &c.

NUCLEUS, in general, denotes the kernel of a nut, or even any seed inclosed within a husk.

The term *nucleus* is also used for the body of a comet, otherwise called its head. See the article **COMET**.

Among the antient architects, *nucleus* signified the middle flooring, which consisted of a strong cement, over which they laid the pavement bound with mortar.

NUDE COMPACT, *nudum pactum*, in law, a contract made without any consideration. See the article **CONTRACT**.

NUDE MATTER, in law, signifies a bare allegation of somewhat done.

NUDIPEDALIA, among the antients, a festival in which all were obliged to walk bare-footed. This was done on account of some public calamity; as the plague, famine, an intense drought and the like. It was likewise usual for the Roman matrons, when any supplication and vows were to be made to the goddess *Vesta*, to walk in procession to her temple bare-footed.

NUDITIES, in painting and sculpture, denotes those parts of an human figure which are not covered with any drapery; or those parts where the carnation appears.

NUL TIEL RECORD, in law, is what the plaintiff generally pleads, on the defendant's pleading matter of record in bar of the action brought by the plaintiff.

NULLITY, in law, signifies any thing that is null or void: thus there is a nullity of marriage, where persons marry within the degrees, or where infants marry without consent of their parents or guardians. See the article **MARRIAGE**.

NUMBER, *numerus*, in arithmetic, an assemblage of several units, or things of the same kind.

Number, says *Malcolm*, is either abstract or applicate; abstract, when referred to things in general, without attending to their particular properties; and applicate, when considered as the number of

a particular sort of things, as yards, trees, or the like.

When particular things are mentioned, there is always something more considered than barely their numbers; so that what is true of numbers in the abstract, or when nothing but the number of things is considered, will not be true, when the question is limited to particular things: for instance, the number two is less than three; yet two yards is a greater quantity than three inches; and the reason is, because regard must be had to their different natures as well as number, whenever things of a different species are considered; for though we can compare the number of such things abstractedly, yet we cannot compare them in any applicate sense. And this difference is necessary to be considered, because upon it the true sense, and the possibility or impossibility of some questions depend.

Number is unlimited in respect of increase, because we can never conceive a number so great, but still there is a greater. However, in respect of decrease, it is limited; unity being the first and least number, below which therefore it cannot descend.

Kinds and distinctions of NUMBERS. Mathematicians, considering number under a great many relations, have established the following distinctions.

Broken numbers are the same with fractions. See the article **FRACTION**.

Cardinal numbers are those which express the quantity of units, as 1, 2, 3, 4, &c. whereas ordinal numbers are those which express order, as 1st, 2^d, 3^d, &c. Compound number, one divisible by some other number besides unity; as 12, which is divisible by 2, 3, 4, and 6. Numbers, as 12 and 15, which have some common measure besides unity, are said to be compound numbers among themselves.

Cubic number is the product of a square number by its root: such is 27, as being the product of the square number 9, by its root 3. All cubic numbers whose root is less than 6, being divided by 6, the remainder is the root itself: thus $27 \div 6$ leaves the remainder 3, its root; 216, the cube of 6, being divided by 6, leaves no remainder; 343, the cube of 7, leaves a remainder 1, which, added to 6, is the cube root; and 512, the cube of 8, divided by 6, leaves a remainder 2, which, added to 6, is the cube root. Hence the remainders of the divisions of the cubes above 216, divided by 6, being added

added to 6, always gives the root of the cube so divided, till that remainder be 5, and consequently 11, the cube-root of the number divided. But the cubic numbers above this, being divided by 6, there remains nothing, the cube-root being 12. Thus the remainders of the higher cubes are to be added to 12, and not to 6; till you come to 18, when the remainder of the division must be added to 18; and so on *ad infinitum*.

Determinate number is that referred to some given unit, as a ternary or three: whereas an indeterminate one, is that referred to unity in general, and is called quantity.

Homogeneal numbers, are those referred to the same unit; as those referred to different units are termed heterogeneous.

Whole numbers are otherwise called integers. See the article INTEGER.

Rational number is one commensurable with unity; as a number, incommensurable with unity, is termed irrational or a surd. See the article SURD.

In the same manner a rational whole number, is that whereof unity is an aliquot part; a rational broken number, that equal to some aliquot part of unity; and a rational mixed number, that consisting of a whole number and a broken one.

Even number, that which may be divided into two equal parts without any fraction, as, 6, 12, &c. The sum, difference, and product of any number of even numbers, is always an even number.

An evenly even number, is that which may be measured, or divided, without any remainder, by another even number, as 4 by 2.

An unevenly even number, when a number may be equally divided by an uneven number, as 20 by 5.

Uneven number, that which exceeds an even number, at least by unity, or which cannot be divided into two equal parts, as, 3, 5, &c.

The sum or difference of two uneven numbers makes an even number; but the factum of two uneven ones makes an uneven number.

If an even number be added to an uneven one, or if the one be subtracted from the other, in the former case the sum, in the latter the difference, is an uneven number; but the factum of an even and uneven number is even.

The sum of any even number of uneven numbers is an even number; and the

sum of any uneven number of uneven numbers is an uneven number.

Primitive or prime numbers, are those only divisible by unity, as 5, 7, &c. And prime numbers among themselves, are those which have no common measure besides unity, as 12 and 19.

Perfect number, that, whose aliquot parts added together, make the whole number, as 6, 28; the aliquot parts of 6 being 3, 2, and 1, = 6; and those of 28, being 14, 7, 4, 2, 1, = 28.

Imperfect numbers, those whose aliquot parts, added together, make either more or less than the whole. And these are distinguished into abundant and defective; an instance in the former case is 12, whose aliquot parts 6, 4, 3, 2, 1, make 16; and in the latter case 16, whose aliquot parts 8, 4, 2, and 1, make but 15.

Plain number, that arising from the multiplication of two numbers, as 6, which is the product of 3 by 2; and these numbers are called the sides of the plane.

Square number, is the product of any number multiplied by itself; thus 4, which is the factum of 2 by 2, is a square number.

Every square number added to its root makes an even number.

Polygonal, or polygonous numbers, the sums of arithmetical progressions beginning with unity: these, where the common difference is 1, are called triangular numbers; where 2, square numbers; where 3, pentagonal numbers; where 4, hexagonal numbers; where 5, heptagonal numbers, &c. See POLYGONAL.

Pyramidal numbers: the sums of polygonous numbers, collected after the same manner as the polygons themselves, and not gathered out of arithmetical progressions, are called first pyramidal numbers: the sums of the first pyramidal are called second pyramidal, &c.

If they arise out of triangular numbers, they are called triangular pyramidal numbers; if out of pentagons, first pentagonal pyramidal.

From the manner of summing up polygonal numbers, it is easy to conceive how the prime pyramidal numbers are found, viz. $\frac{(a-2)n^3 + 3n^2 - (a-5)n}{6}$

expresses all the prime pyramidal.

Golden NUMBER, in chronology. See the article GOLDEN.

NUMBER, in grammar, a modification of nouns, verbs, &c. to accommodate them to the varieties in their objects, consider-

ed with regard to number. See the articles NOUN and VERB.

Nouns or names agreeing to several things, may be considered either as applied to one of those things singularly, or to a number of them; and those considered either as several, or as united. To distinguish these cases, two numbers have been invented, the singular and plural. When a noun indicates an object considered as single, or alone, or a number of them considered as united together, it is said to be of the singular number, as a plant, an army, a church. When it indicates several objects, and those as distinct, it is of the plural number, as plants, armies, churches: and when I speak of myself as making a part of several others, instead of saying I, it is proper to say we, &c.

The Greeks have a third number which they call dual number, as signifying two: the Hebrews have something like it; but then it only takes place when the words signify a thing double, either by nature, as the hands, eyes, &c. or by art, as scissars, tongs, &c. As to common and appellative names, they seem all naturally to require a plural number, yet are there several which have none, as the name of gold, steel, &c.

The difference of numbers in nouns is expressed by a difference of termination. In English the singular is usually converted into plural by adding s, as plant, plants; book, books, &c. Where the pronunciation requires it, as where the singular ends in s or x, sh or ch, it is usually done by the addition of es, instead of s. Very often the plural is formed by en, as from ox is formed the plural oxen; and from man, men; brother, brethren, &c. Those nouns whose singulars end in f, or fe, form the plural by ves; as calf, calves; loaf, loaves; wife, wives, &c. However, the formation of the plural of many words can be reduced to no rule at all, being mere irregulars; as from mouse is formed the plural mice; from foot, feet, &c. And in many words there is no difference of number; as in sheep, deer, &c. Again, some words have no singular numbers; as ashes, bellows, lungs, breeches, &c. and others no plural; as the names of countries, virtues and vices, metals, herbs, and corn. The plurals of adjectives, tho' varied from the singular in most languages, yet in english are generally the same,

NUMBERS, in poetry, oratory, music, &c. are certain measures, proportions, or cadences, which render a verse, period, or song, agreeable to the ear. See METRE. Poetical numbers consist in a certain harmony in the order, quantities, &c. of the feet and syllables; which make the piece musical to the ear, and fit for singing, for which all the verses of the antients were intended. See the articles MEASURE and RHYME.

It is of these numbers Virgil speaks in his ninth Eclogue, when he makes Lycidas say, *Numeros memini, si verba tenerem*; meaning, that although he had forgot the words of the verses, yet he remembered the feet and measure of which they were composed.

Rhetorical, or prosaic numbers, are a sort of simple unaffected harmony, less glaring than that of verse, but such as is perceived and affects the mind with pleasure.

The numbers are that by which the style is said to be easy, free, round, flowing, &c. Numbers are things absolutely necessary in all writing, and even in all speech. Hence Aristotle, Tully, Quintilian, &c. lay down abundance of rules as to the best manner of intermixing dactyles, spondees, anapests, &c. in order to have the numbers perfect. The substance of what they have said, is reducible to what follows. 1. The style becomes numerous by the alternate disposition and temperature of long and short syllables, so as that the multitude of short ones neither render it too hasty, nor that of long ones too slow and languid: sometimes, indeed, long and short syllables are thrown together designedly without any such mixture, to paint the slowness or celerity of any thing by that of the numbers; as in these verses of Virgil: *Illi inter sese magna vi brachia tollunt*; and

*Radit iter liquidum, celeres neque commo-
vet alas.*

2. The style becomes numerous by the intermixing words of one, two, or more syllables; whereas the too frequent repetition of monosyllables renders the style pitiful and grating. 3. It contributes greatly to the numerousness of a period to have it closed by magnificent and well sounding words. 4. The numbers depend not only on the nobleness of the words in the close, but of those in the whole tenor of the period. 5. To have the period flow easily and equally; the

the harsh concurrence of letters and words is to be studiously avoided, particularly the frequent meeting of rough consonants; the beginning the first syllable of a word with the last of the preceding; the frequent repetition of the same letter or syllable; and the frequent use of the like ending words. Lastly, the utmost care is to be taken lest, in aiming at oratorical numbers, you should fall into poetical ones; and instead of prose, write verse.

Book of NUMBERS, the fourth book of the Pentateuch, taking its denomination from its numbering the families of Israel.

A great part of this book is historical, relating to several remarkable passages in the Israelites march through the wilderness. It contains a distinct relation of their several movements from one place to another, or the two and forty stages through the wilderness, and many other things, whereby we are instructed and confirmed in some of the weightiest truths that have immediate reference to God and his providence in the world. But the greatest part of this book is spent in enumerating these laws and ordinances, whether civil or ceremonial, which were

given by God, but not mentioned before in the preceding books.

NUMB-FISH, the same with the torpedo, or cramp-fish. See the article **TORPEDO**.

NUMENIUS, in ornithology, a genus of birds of the order of the scolopaces; the beak of which is of a figure approaching to a cylindric one, it is obtuse at the point, and is longer than the toes, the feet have each 4 toes connected together. This genus comprehends the curlew, the woodcock, the great plover, and the snipe. See the article **CURLEW**, &c.

NUMERAL LETTERS, those letters of the alphabet which are generally used for figures, as I, V, X, L, C, D, M. See the article **NUMERATION**.

NUMERAL CHARACTERS. See the article **CHARACTER**.

NUMERALS, in grammar, those words which express numbers; as 6, 8, 10, &c.

NUMERATION, or **NOTATION**, in arithmetic, the art of expressing in characters any number proposed in words; or of expressing in words any number proposed in characters.

The characters used to express numbers by, are either the ten numeral figures of the Arabians, viz.

one, two, three, four, five, six, seven, eight, nine, cypher;

1 2 3 4 5 6 7 8 9 0

Or the seven numeral letters of the Romans,

one, five, ten, fifty,
I V X L

hundred, five-hundred, thousand.
C D M

Each of which figures, besides their own single value, receives several denominations according to their place and order. A number has so many places as there are figures in it, as 36487 is the number of five places. The order in whole numbers is from the right to the left. The

value of places decreases in a decuple proportion: for every place to the left is ten times the value of the next place to the right. Each place also has its name; and those names, for the more easy reading of large numbers, are distinguished by periods, half-periods, &c.

For as a place }
So a half-period } is { ten
And a period } a thousand } times the value
a million } of that before it.

A cypher is of itself insignificant; but by its place alters the value of the subsequent figure: and, since the value of

each place is ten times the value of the next before it, it is certain

that { 1 } in the first { 10 } in the { 100 } in the { 1000 } in the
2 } place, is 20 } second, 200 } third, 2000 } fourth,
3 } 30 } 300 } 3000 } &c.
&c.

The value of each figure in any rank of numbers, how large soever, is readily found by the following rule.

Begin at units, set a point under the

seventh place; then reckoning that as one, count forwards, and set another under the next seventh place, so continue to the end.

13 K 2

Then

Then the { first
second
third
fourth, &c. } point from units
stands under { millions,
billions,
trillions,
quadrillions, &c.

As is evident in the following example,

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|----------|---|-------|-----------|---|-------|----------|---|-------|----------|---|-------|-------|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Periods | Quadril. | | | Trillions | | | Billions | | | Millions | | | Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Half-periods | th. | | units | th. | | units | th. | | units | th. | | units | th. | | units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Degrees | c | x | u | c | x | u | c | x | u | c | x | u | c | x | u | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Figures | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 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2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | |

By this means you may have as clear a notion of, and may as easily read a number of seventy places as of seven.

NUMERATOR of a fraction. See the article **FRACTION**.

NUMERICAL, NUMEROUS, or NUMERICAL, something belonging to numbers; as numerical algebra is that which makes use of numbers instead of letters of the alphabet. Also, numerical difference, is the difference whereby one individual is distinguished from another. Hence a thing is said to be numerically the same, when it is so in the strictest sense of the word. See the articles **UNITY** and **IDENTITY**.

NUMERO, in commerce. See the article **BOOK OF NUMERO'S**.

NUMIDIA, the antient name of Biledulgerid, in Africa. See **BILEDULGERID**.

NUMISMATOGRAPHIA, a term used for the description and knowledge of antient medals and coins, whether of gold, silver, or brass.

NUMMUS, or NUMUS, among the Romans, a piece of money otherwise called sestertius. See **MONEY** and **SESTERCE**.

NUN, a woman, in several christian countries, who devotes herself, in a cloister or nunnery, to a religious life. See the article **MONK**.

There were women in the antient christian church, who made public profession of virginity before the monastic life was known in the world, as appears from the writings of Cyprian and Tertullian. These, for distinction's sake, are sometimes called ecclesiastical virgins, and were commonly enrolled in the canon or matricula of the church. They differed from the monastic virgin chiefly in this, that they lived privately in their father's houses, whereas the others lived in communities: but their profession of virginity was not so strict as to make it cri-

minal in them to marry afterwards, if they thought fit. As to the consecration of virgins, it had some things peculiar in it: it was usually performed publicly in the church by the bishop. The virgin made a public profession of her resolution, and then the bishop put upon her the accustomed habit of sacred virgins. One part of this habit was a veil called the sacrum velamen, another was a kind of mitre or coronet worn upon the head. At present, when a woman is to be made a nun, the habit, veil, and ring of the candidate are carried to the altar, and she herself, accompanied by her nearest relations, is conducted to the bishop, who, after mass and an anthem, the subject of which is, "that she ought to have her lamp lighted, because the bridegroom is coming to meet her," pronounces the benediction; then she rises up, and the bishop consecrates the new habit, sprinkling it with holy-water. When the candidate has put on her religious habit, she presents herself before the bishop, and sings, on her knees, *ancilla Christi sum*, &c. then she receives the veil, and afterwards the ring, by which she is married to Christ; and lastly the crown of virginity. When she is crowned, an anathema is denounced against all who shall attempt to make her break her vows. The several orders of nuns in the romish and greek churches, are mentioned under separate articles.

NUNCIO, or NUNTIO, an ambassador from the pope to some catholic prince or state, or a person who attends on the pope's behalf at a congress, or an assembly of several ambassadors.

The nuncio has a jurisdiction, and may delegate judges in all the states where he resides, except in France, where he has no authority but that of a simple ambassador. See the article **EMBASSADOR**.

NUNCU-

NUNCUPATIVE, in the schools, something that is only nominal, or has no existence but in name.

NUNCUPATIVE WILL, denotes a last will or testament, only made verbally, and not put in writing. See the articles **WILL** and **TESTAMENT**.

NUNDINAL, **NUNDINALIS**, a name which the Romans gave to the eight first letters of the alphabet, used in their calendar.

This series of letters, A, B, C, D, E, F, G, H, is placed and repeated successively from the first to the last day of the year: one of these always expressed the market-days, or the assemblies called *nundinæ*, *quasi novendinæ*, because they returned every nine days. The country people, after working eight days successively, come to town the ninth, to sell their several commodities, and to inform themselves of what related to religion and government. Thus the nundinal day being under A on the first, ninth, seventeenth, and twenty-fifth days of January, &c. the letter D will be the nundinal letter of the year following. These nundinals bear a very great resemblance to the dominical letters, which return every eight days, as the nundinals did every nine. See **DOMINICAL LETTER**.

NUPER OBIT, in law, a writ that lies for a sister and coheir, who is deforced by her coparcener of lands, &c. of which their ancestor died seised in fee. Here, if one sister deforces another of land that is held in tail, the other sister shall bring a formedon against her, and not this writ, &c. But a writ of *rationabili parte* lies where the ancestor was once seised, yet died not seised of the possession, but the reversion.

NUPTIAL RITES, the ceremonies attending the solemnization of marriage, which are different in different ages and countries. See the article **MARRIAGE**.

The nuptial rites among the Jews are performed in the following manner. The bridegroom and bride are placed under a canopy, each of them covered with a black veil. The rabbin of the place, the chanter of the synagogue, or the nearest relation of the husband, takes a cup full of wine, and having pronounced a benediction, he presents the cup to the bridegroom, and then to the bride, who just taste of the liquor. Afterwards the bridegroom puts a ring upon the bride's finger, saying, "By this ring thou art my spouse, &c."

Then they read the contract of marriage, which the bridegroom puts into the hands of the bride's relations: afterwards they rehearse six blessings; the married couple drink wine, and the vessel is thrown with violence against the ground, and broken in pieces. Before the destruction of the temple, the bridegroom and bride wore crowns on their heads, but since that time this custom has ceased. In the ceremonies of marriage, the Hebrews pretend, that they imitate chiefly what was done at Tobias's wedding, which they look upon as a model of a regular and happy marriage. When the company are set down to supper, the bridegroom sings a blessing in the Hebrew language: after supper they perform a dance, which they call the dance of the commandment, and before leading the bride into the marriage-chamber, they rehearse a blessing.

Great part of the nuptial rites of the antient Greeks, consisted in offering sacrifices to different deities, taking of omens, the parties taking one another by the hand, and kissing each other in token of fidelity, &c. For a further account of their ceremonies on this occasion, see the articles **BRIDE** and **BRIDEGROOM**, &c. For an account of the marriage rites of the antient Romans, see **CONFARRATION**, **EPITHALAMIUM**, &c.

Among the antient christians, the espousing parties joined hands together. It was usual to crown the bridegroom and bride with garlands, nor was it reckoned any harm to have a decent epithalamium. In the romish church, the priest is attended at the altar by two clerks, carrying the holy-water pot, the sprinkler, and a little bason to put the ring in. After a prayer, and asking their mutual consent, and joining their hands, he pronounces the formula, *Ego jungo vos*, &c. at the same time making the sign of the cross towards them, and sprinkling them with holy-water; this done, he blesses the marriage-ring, and sprinkling it with holy-water, after which he gives it to the bridegroom, who puts it on the bride's wedding-finger. Before consummation, the priest usually blesses the marriage bed, by sprinkling it with holy-water.

The nuptial ceremonies of our own church are too well known, and that of the several nations of the world too numerous to be inserted here.

NURENBURG, the capital of a territory

tory of the same name, in the circle of Franconia, in Germany: east long. 11° , north lat. $49^{\circ} 30'$.

NURSERY, in gardening, is a piece of land set apart for raising and propagating all sorts of trees and plants, to supply the garden and other plantations. In a nursery for fruit-trees, the following rules are to be observed: 1. That the soil should not be better than that in which the trees are to be planted out for good. 2. That it ought to be fresh, and not such as has been already worn out by trees, or other large growing plants. 3. It ought neither to be too wet, nor too dry, but rather of a middling nature; though, of the two extremes, dry is to be preferred; because, though trees in such a soil do not make so great a progress, yet they are generally sounder, and more disposed to fruitfulness. 4. It must be inclosed in such a manner that neither cattle nor vermin may come in; and so as particularly to exclude hares and rabbits, which, when the ground is covered with snow, are great destroyers of young trees. 5. The ground being inclosed should be carefully trenched about two feet deep; this should be done in August, that it may be ready for receiving young stocks at the season for planting, which is commonly about the beginning of October: in trenching the ground, you must be careful to cleanse it from the roots of all noxious weeds. 6. The season being come for planting, level down the trenches as equal as possible; and then lay out the ground into quarters, which may be laid out in beds for a seminary, in which you may sow the seeds or stones of fruit. 7. And having provided yourself with stocks, the next year proceed to transplant them, in the following manner: draw a line across the ground intended to be planted, and open a number of trenches exactly straight; then take the stocks out of the seed-beds; in doing which, you should raise the ground with a spade, in order to preserve the roots as intire as possible; prune off the very small fibres, and if there are any that have a tendency to root directly downwards, such roots should be shortened. Then plant them in the trenches, if they are designed for standards, in rows three feet and a half, or four feet, from each other, and a foot and half distant in the rows; but if for dwarfs, three feet, row from row, and

one foot in the row will be a sufficient distance. These plants should by no means be headed, or pruned at top, which will weaken them, and cause them to produce lateral branches. If the winter should prove very cold, lay some mulch on the surface of the ground near their roots, taking care not to let it lie too thick near the stems of the plants, and to remove it as soon as the frost is over. In the summer-season destroy the weeds, and dig up the ground every spring between the rows. The second year after planting, such of the stocks as are designed for dwarfs will be fit to bud; but those that are designed for standards should be suffered to grow five or six feet high before they are budded or grafted; for the manner of doing which, see the articles **INOCULATION** and **GRAFTING**. As to timber-trees, Mr. Miller advises those gentlemen who would have plantations in parks, woods, &c. to make nurseries upon the ground intended for planting, where a sufficient number of the trees may be left standing, after the others have been drawn out to plant in other places.

The ground intended for the flower-nursery should be well situated to the sun; and defended from strong winds by plantations of trees or buildings. The soil also should be light and dry, especially for bulbous-rooted flowers; for in this nursery the off-sets of all bulbous-rooted flowers should be planted; and remain there till they become blowing roots, when they should be removed into the pleasure-garden, and planted either in beds or borders, according to the goodness of the flowers. These flowers may also be raised in the nursery from seed. The seedling auriculas polyanthuses, ranunculuses, anemonies, carnations, &c. should be raised in this nursery, where they should be preserved till they have flowered, when all those should be marked that are worthy of being transplanted into the flower-garden; this should be done in their proper seasons: for all these seedling flowers ought not indiscriminately to be exposed to public view in the pleasure-garden, because it always happens, that there are great numbers of ordinary flowers produced among them, which will there make but an indifferent appearance.

NUSANCE, in law, a thing done to the annoyance of another.

Nusances

Nuſances are either public or private: a public nuſance is an offence againſt the public in general, either by doing what tends to the annoyance of all the king's ſubjects, or by neglecting to do what the common good requires: in which caſe all annoyances and injuries to ſtreets, highways, bridges, and large rivers; as alſo diſorderly ale-houſes, bawdy-houſes, gaming-houſes, ſtages for rope-dancers, &c. are held to be common nuſances. A private nuſance is when only one perſon or family is annoyed, by the doing of any thing; as where a perſon ſtops up the light of another's houſe, or builds in ſuch a manner that the rain falls from his houſe upon his neighbour's; as likewise the turning or diverting water from running to a man's houſe, mill, meadow, &c. ſtopping up a way that leads from houſes to lands; ſuffering a houſe to decay, to the damage of the next houſe; erecting a brew-houſe in any place not convenient; or an houſe of office, &c. ſo near another perſon's houſe as to offend him by its ſmell.

Indictment lies for a public or common nuſance at the king's ſuit, whereon the party offending ſhall be fined and impriſoned; but no action can be brought in this caſe except one man ſuffers more by a common nuſance than another; as where a pit is dug in the high-way, and he falls into it. Action on the caſe, or aſſiſe of nuſance, lies, for any private nuſance, at the ſuit of the party ag-grieved, and on ſuch actions judgment is given that the nuſance ſhall be removed, and the injured party recover damages: but if a perſon has only a term of years in a houſe or lands, as he has no freehold therein, he can only have an action on the caſe, by which the nuſance will be removed without his recovering damages. The continuation of a nuſance, is by the law conſidered as a new nuſance, and therefore where a perſon ſuffers a nuſance to be ſet up, and then alienates or lets the land, &c. without removing it, an action of the caſe lies againſt him who erected it; and alſo againſt the alienee or leſſee, for continuing it. It has been adjudged that any perſon may remove a nuſance, in which caſe, even the cutting down a gate that croſſes the highway is legal; yet if a man deſtroys the nuſance himſelf, before he commences his action, he cannot have it afterwards, nor recover damages. Neither the lord of a manor,

nor the king himſelf, can licence any perſon to make or erect a nuſance.

NUT, *nux*, among botaniſts, denotes a pericarpium of an extraordinary hardneſs, incloſing a kernel or ſeed.

Of theſe there are ſeveral kinds, as filberts, walnuts, &c. See the articles FILBERT, WALNUT, &c.

The word nut makes part of the engliſh names of ſeveral plants, as the bladder-nut, or ſtaphylæa; the earth-nut; the malabar-nut; the peafe-nut; the phyſic-nut; the ſpaniſh-nut, &c. See the article STAPHYLÆA, &c.

NUT-HATCH, *sitta*, in ornithology. See the article SITTA.

NUTATION, in aſtronomy, a kind of tremulous motion of the axis of the earth, whereby, in each annual revolution, it is twice inclined to the ecliptic, and as often returns to its former poſition. See EARTH and INCLINATION.

Sir Iſaac Newton obſerves, that the moon has the like motion, only very ſmall, and ſcarce ſenſible.

NUTMEG, *nux moschata*, in natural hiſtory, the kernel of a large fruit, not unlike the peach, the produce of a tree called by botaniſts myriſtica. See the article MYRISTICA.

The nutmeg is ſeparated from its inveſtient coat, the mace, before it is ſent over to us; except that the whole fruit is ſometimes imported in preſerve, by way of ſweetmeat, or as a curioſity. See the article MACE.

The nutmeg, as we receive it, is of a roundiſh or oval figure, of a tolerably compact and firm texture, but eaſily cut with a knife, and falling to pieces on a ſmart blow. Its ſurface is not ſmooth, but furrowed with a number of wrinkles, running in various directions, though principally longitudinally. It is of a greyiſh brown colour on the outſide, and of a beautiful variegated hue within, being marbled with brown and yellow variegations, running in perfect irregularity through its whole ſubſtance. It is very unctuous and fatty to the touch, when powdered, and is of an extremely agreeable ſmell, and of an aromatic taſte, without the heat that attends that kind of flavour in moſt of the other ſpecies.

There are two kinds of nutmeg in the ſhops, the one called by authors the male, and the other the female. The female is the kind in common uſe, and is of the ſhape

shape of an olive : the male is long and cylindric, and has less of the fine aromatic flavour than the other, so that it is much less esteemed, and people who trade largely in nutmegs will seldom buy it. Besides this oblong kind of nutmegs, we sometimes meet with others of perfectly irregular figures, but mere *lusus naturæ*, not owing to a different species of the tree. The longer male nutmeg, as we term it, is called by the Dutch the wild nutmeg. It is always distinguishable from the others, as well by its want of fragrancý, as by its shape : it is very subject to be worm-eaten, and is strictly forbid, by the Dutch, to be packed up among the other, because it will give occasion to their being worm-eaten too, by the insects getting from it into them, and breeding in all parts of the parcel.

The largest, heaviest, and most unctuous of the nutmegs are to be chosen, such as are of the shape of an olive, and of the most fragrant smell. The Dutch import them from the East-Indies.

Nutmeg is greatly used in our foods, and is of excellent virtues as a medicine ; it is a good stomachic, it promotes digestion, and strengthens the stomach. It also stops vomiting ; is an excellent remedy in flatulæ ; and is happily joined with rhubarb, and other medicines, in diarrhœas. It is observed to have a soporific virtue, and to exert it too strongly, if taken in immoderate quantities. It has a considerable degree of astringency ; and given after toasting before the fire, till thoroughly dry and crumbly, it has been sometimes known alone to cure diarrhœas.

Nutmegs on being imported, pay a duty of 1 s. 6 d. $\frac{38\frac{5}{8}}{100}$ d. and draw back, on ex-

portation, 1 s. $4\frac{33\frac{1}{5}}{100}$ d.

NUTRITION, in the animal œconomy, is the repairing the continual loss, which the different parts of the body undergo. The motion of the parts of the body, the friction of these parts with each other, and especially the action of the air, would destroy the body entirely, if the loss was not repaired by a proper diet, containing nutritive juices ; which being digested in the stomach, and afterwards converted into chyle, mix with the blood, and are distributed through the whole body for its nutrition. See the ar-

ticles **DIET**, **DIGESTION**, **CHYLE**, &c. In young persons, the nutritive juices not only serve to repair the parts that are damaged, but also to encrease them, which is called growth.

In grown persons, the cuticle is every where constantly desquamating, and again renewing ; and in the same manner the parts rubbed off, or otherwise separated from the fleshy parts of the body, are soon supplied with new flesh ; a wound heals, and an emaciated person grows plump and fat. See the article **CORPULENCY**.

Buffon, in order to account for nutrition, supposes the body of an animal, or vegetable, to be a kind of mould, in which the matter necessary to its nutrition is modeled and assimilated to the whole. But, continues he, of what nature is this matter, which an animal, or vegetable, assimilates to its own substance ? What power is it that communicates to this matter the activity and motion necessary to penetrate this mould ? and, if such a force exist, would it not be by a similar force that the internal mould itself might be reproduced ?

As to the first question, he shews, that there exists in nature an infinite number of living organical parts, and that all organized bodies consist of such organical parts ; that their production costs nature nothing, since their existence is constant and invariable ; so that the matter which the animal, or vegetable, assimilates to its substance, is an organical matter, of the same nature with that of the animal, or vegetable, which consequently may augment its volume, without changing its form, or altering the quality of the substance in the mould.

As to the second question : there exist, says he, in nature, certain powers, as that of gravity, that have no affinity with the external qualities of the body, but act upon the most intimate parts, and penetrate them throughout, and which can never fall under the observation of our senses.

And, as to the third question, he answers, that the internal mould itself is reproduced, not only by a similar power, but it is plain that it is the very same power that causes the unfolding and reproduction thereof : for it is sufficient, proceeds he, that, in an organized body that unfolds itself, there be some part similar to the whole, in order that this part

part may one day become itself an organized body, altogether like that of which it is actually a part.

Defect of NUTRITION, or ATROPHY, in medicine. See ATROPHY.

NUTRITION, in pharmacy, a kind of preparation, consisting in the gradual mixture of liquors of different natures, by stirring them together till they have acquired a thick consistence, as in making butter of saturn, &c.

NUTTUNO, or NETTUNO. See the article NETTUNO.

NUX, the WALNUT-TREE, in botany. See the article JUGLANS.

NUX CUPRESSI, CYPRESS-NUT, a fruit improperly so called, as not at all of the nut-kind, is accounted a very powerful astringent and balsamic, scarce any simple medicine being preferable to it in diarrhoeas and dysenteries. It is also said to be a very good febrifuge.

NUX MOSCHATA. See NUTMEG.

NUX PISTACHIA. See PISTACHIA.

NUX VOMICA. See NUX VOMICA.

NUYS, a town of Germany, twenty miles north of Cologne.

NYBURG, a town of Denmark, situated at the east-end of the island of Funen, ten miles east of Odensee: east long. 10°, north lat. 55° 30'.

NYCTHEMERON, *νυχθημερον*, the natural day, or day and night, which together always make twenty-four hours. See the articles DAY and NIGHT.

NYCTALOPIA, in medicine, a two-fold disorder of the eye, one of which is opposite to the other. In the first, the sight is best in the night, and in obscure places; whereas, in a clear light, their sight fails, so that they can hardly see any thing. In the other sort of nyctalopia, the patient can see nothing at all except in a clear and bright light.

As these infirmities arise from a natural bad formation of the eye; they are therefore incurable.

NYCTANTHES, *Arabian* JASMINE, in botany, a genus of the diandria-monogynia class of plants, the flower of which consists of a single saucer-like petal, with the limb divided into eight oblong segments: the fruit is a didymous, bilocular berry, with a large roundish seed in each cell.

NYCTICORAX, a bird of the heron-kind, called in english the night-raven; by reason it flies chiefly in the night-time, and makes a very disagreeable croaking.

VOL. III.

NYLAND, a province of Finland, situated on the gulph of Finland, west of the province of Carelia.

NYMPH, in mythology, an appellation given to certain inferior goddesses inhabiting the mountains, woods, waters, &c. said to be the daughters of Oceanus and Tethys. All the universe was represented as full of these nymphs, which are distinguished into several ranks or classes. The general division of them is into celestial and terrestrial; the former of which were called Uraniae, and were supposed to be intelligences that governed the heavenly bodies or spheres. The terrestrial nymphs called Epigeiae, presided over the several parts of the inferior world, and were divided into those of the water, and those of the earth. The nymphs of the water were the oceanitides, or nymphs of the ocean; the nereids, the nymphs of the sea; the naiads and ephydriades, the nymphs of the fountains; and the limniades, or nymphs of the lakes. The nymphs of the earth were the oreades, or nymphs of the mountains; the napœæ, nymphs of the meadows; and the dryads and hamadryads, who were nymphs of the forests and woods. Besides these, we meet with nymphs who took their names from particular counties, rivers, &c. as the cithæroniades, so called from mount Cithæron in Boeotia; the dodonides, from Dodona; the tiberiades, from the Tiber, &c.

Goats were sometimes sacrificed to the nymphs; but their constant offerings were milk, oil, honey and wine.

NYMPH, among naturalists, that state of winged-insects between their living in the form of a worm, and their appearing in the winged or most perfect state.

The eggs of insects are first hatched into a kind of worms, or maggots; which afterwards pass into the nymph-state, surrounded with shells or cases of their own skins: so that, in reality, these nymphs are only the embryo-insects, wrapped up in this covering; from whence they at last get loose, though not without great difficulty.

During the nymph-state, the creature loses its motion. Swammerdam calls it *nympha aurelia*, or simply *aurelia*; and others give it the name of *chrysalis*, a term of the like import. See the article CHRYSALIS.

NYMPHÆ, in anatomy, two membranaceous parts, situated on each side the

rima. They are of a red colour and cavernous structure, somewhat resembling the wattles under a cock's throat. They are sometimes smaller, sometimes larger, and are continuous to the præputium of the clitoris, and joined to the interior side of the labia.

The nymphæ are full of nervous papillæ, whence their quick sense: they have also small glands, that secrete a fatty matter. Their use seems to be to increase the pleasure in coition, and to direct the course of the urine.

The nymphæ are sometimes so large, as not only to hang without the labia pudendi; but also to prove very troublesome to the woman in walking, sitting, and in conjugal embraces, so as to require the surgeon's assistance.

When this is the case the patient being laid in a proper posture, the surgeon should take hold of the nymphæ with his left-hand, and with a pair of scissars in his right-hand, cut off so much of them as is judged necessary; taking care to have styptics in readiness to stop the hæmorrhage, and cordial medicines to prevent the patient from fainting. The wound is to be dressed with some vulnerary balsam, and healed in the common method. See the article WOUND.

This operation is rarely found necessary in our parts of the world, but is frequently practised in the east; being properly the circumcision of women. See the article CIRCUMCISION.

NYMPHÆA, the WATER-LILY, in botany, a genus of the polyandria-mono-

gynia class of plants, the flower of which consists of a number of petals, usually fifteen: they are smaller than the cup, and are inserted into the side of the germen in more than a single series: the fruit is an oval fleshy berry, containing a great many roundish seeds.

The root of this plant was recommended by the antients, as an astringent for internal use, and as a styptic to stop the bleeding of wounds, or other hæmorrhages. At present, it is not much known in the shops; but the common people use it internally for the fluor albus in women, and for gleets and seminal weaknesses in men.

NYMPHEUM, in antiquity, a public hall, magnificently decorated, for entertainment, &c. and where those, who wanted convenience at home, held their marriage-feasts; whence the name.

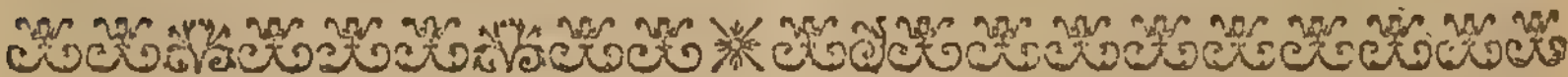
NYMPHOMANIA, in medicine, the same with furor uterinus. See FUROR.

NYMPHOTOMIA, in surgery, the operation of cutting the nymphæ, when too large. See the article NYMPHÆ.

NYONS, a town of Dauphine, in France; east long. 5° 6', north lat. 44° 28'.

NYSLOT, a town of Sweden, in the province of Finland, sixty miles north of Wyburg: east long. 29°, north lat. 62°.

NYSSA, in botany, a genus of the dioecia decandria class of plants, the flower of which is divided into five segments: the style is single; and the fruit is a drupe, containing only one cell, with a single nut. It is a native of Virginia.



O.

O, or O, the fourteenth letter, and fourth vowel of our alphabet, pronounced as in the words *nose*, *rose*, &c.

The sound of this letter is often so soft, as to require it double; and that chiefly in the middle of words; as *goose*, *reproof*, &c. and in some words this *oo* is pronounced like *u* short, as in *flood*, *blood*, &c.

As a numeral, O is sometimes used for

eleven; and with a dash over it, thus \bar{O} , for eleven thousand.

In the notes of the antients, O. CON. is read *opus conductum*; O. C. Q. *opera confilioque*; O. D. M. *operæ, donum, munus*; and O. LO. *opus locatum*.

In music, the O, or rather a circle, or double CO, is a note of time, called by us a semi-breve; and, by the Italians, *circolo*. The \bar{O} is also used as a mark of triple time, as being the most perfect

perfect of all figures. See TRIPLE.

OAK, *quercus*, in botany, a genus of the monoecia-polyandria class of plants, without any flower-petals; the stamina are from five to ten in number; the cup of the female flower is formed of a single, coriaceous leaf, undivided at the edge, and rough: the styles are from two to five: the seed is single, large and oval. For the galls of the oak. See GALLS.

Oak-timber is one of the principal materials in building; and being strong in all positions, may be trusted in cross and transverse-work, as for summers, beams, &c.

OAK of Jerusalem, in botany, a name given to chenopodium. See the article CHENOPODIUM.

Poison OAK. See TOXICODENDRUM.

OKAM, old ropes untwisted, and pulled out into loose hemp, in order to be used in caulking the seams, tree-nails and bends of a ship, for stopping or preventing leaks.

OKHAMPTON, a borough of Devonshire, twenty miles west of Exeter, which sends two members to parliament.

OAR, in navigation, a long piece of wood, made round where it is to be held in the hand, and thin and broad at the other end, for the easier cutting and resisting the water, and consequently moving the vessel, by rowing. Oars for ships are generally cut out of fir-timber, those for barges are made out of New-England, or Dantzick-rafters, and those for boats, either out of english-ash, or fir-rafters from Norway.

OAT, *avena*, in botany, a genus of the triandria-digynia class of plants, the corolla of which consists of two valves; the nectaria are two; from the back of the corolla, there grows a single, crooked, and contorted arista, or awn: the corolla serves as a pericarpium, surrounding a single seed, which is of an oblong figure, very sharp-pointed at each end, and with a longitudinal furrow,

Some physicians have recommended a diet-drink made of oats, in various distempers. The method of preparing it is as follows: Take of fresh oats entire, and well washed, one pound and a half; of the fresh root of succory, cut into slices, one handful; of spring-water, twelve pints; boil all together in an earthen vessel, till half is consumed; then strain the liquor through a linen cloth, and add to it six ounces of coarse sugar, and half an ounce of sal prunellæ; let it boil again, then set it by for a day

and a night in a cool place; lastly, pour off the clear liquor, and keep it in a cellar in vessels close stopped.

Two ordinary cups of this liquor given twice a day, three hours before, and as many after dinner, are said to do wonders in the cure of all kinds of fevers, colic-pains, pleurifies, the itch, cutaneous tumours, and hypochondrical disorders; as also in cleansing the kidneys from sand, and opening the obstructed viscera. The use of it is to be continued thirteen days.

OATH, *jusjurandum*, is a solemn affirmation in which the persons sworn invoke the almighty to witness that their testimony is true, renouncing all claim to his mercy, and calling for his vengeance if it be false: on which account such an oath is termed sacramentum, a holy band, or tie; and it is also called a corporal oath, because the person who takes it, lays his right-hand on the book of the Evangelists. All oaths must be administered by a person duly authorized, and in order to discover truth and right; and therefore, if a person not duly authorized, administers an oath, he is punishable both with fine and imprisonment. A person who is to be a witness in a cause may have two oaths administered to him; the one to speak the truth, in relation to what the court shall think fit to ask him, concerning himself or any thing else that is not evidence in the cause; and the other purely to give evidence in the cause wherein he is produced as a witness; the former of which is called an oath upon a voyer dire. By statute, all that bear offices of any kind under the government, members of the house of commons, ecclesiastical persons, members of colleges, school-masters, serjeants at law, counsellors, attornies, solicitors, advocates, proctors, &c. are required to take the oaths of allegiance, supremacy, and abjuration; all persons neglecting, or refusing to take these oaths are declared to be incapable of executing their offices and employments, of suing at law, of being guardians, executors, &c. and are liable to the forfeiture of 500 l. 13 W. III. c. 6. 1 Ann. c. 22. and 1 Geo. I. c. 13.

OBDACH, a town of Germany, in the circle of Austria and duchy of Stiria, thirty-five miles west of Gratz.

OBADIAH, or *the prophecy of OBADIAH*, a canonical book of the Old Testament, which is contained in one single chapter

and is partly an invective against the cruelty of the Edomites, who mocked and derided the children of Israel, as they passed into captivity, and with other enemies, their confederates, invaded and oppressed those strangers, and divided the spoil amongst themselves: and partly a prediction of the deliverance of Israel, and of the victory and triumph of the whole church over her enemies.

OBEDIENCE, or **OBEDIENTIA**, in the canon-law, is sometimes used for an office, or the administration of it. In our antient customs obedientia was used, in the general, for every thing that was enjoined the monks by the abbots: and in a more limited sense it was applied to the farm belonging to the abbey, to which the monks were sent *vi ejusdem obedientiæ*, either to look after the farm, or collect the rents. Hence, these rents themselves were also called *obedientiæ*.

OBELISK, in architecture, a truncated, quadrangular, and slender pyramid, raised as an ornament, and frequently charged either with inscriptions or hieroglyphics.

Obelisks appear to be of very great antiquity, and to be first raised to transmit to posterity precepts of philosophy, which were cut in hieroglyphical characters: afterwards they were used to immortalize the great actions of heroes, and the memory of persons beloved. The first obelisk mentioned in history was that of Rameses king of Egypt, in the time of the Trojan war, which was forty cubits high. Phius, another king of Egypt, raised one of forty-five cubits; and Ptolemy Philadelphus, another of eighty-eight cubits, in memory of Arsinoë. Augustus erected one at Rome in the Campus Martius, which served to mark the hours on an horizontal dial, drawn on the pavement. They were called by the Egyptian priests the fingers of the sun, because they were made in Egypt also, to serve as styles, or gnomons to mark the hours on the ground. The Arabs still call them Pharaoh's needles, whence the Italians call them *aguglia*, and the French *aiguilles*.

The proportions in the height and thickness are nearly the same in all obelisks; their height being nine, or nine and a half, and sometimes ten times their thickness; and their diameter at the top never less than half, and never greater than three fourths of that at the bottom.

OBELISK, †, in grammar, a mark in form of a dagger, used to refer the reader to a note in the margin, at the side or bottom of a page.

OBERNSBERG, a town of Germany, in the circle of Bavaria, fifteen miles south of Passau.

OBERSTEIN, the capital of the county of the same name, in the Palatinate of the Rhine, thirty miles east of Triers.

OBERWESEL, or **WESEL**, a town of Germany, in the electorate of Triers, thirty-seven miles north-east of the city of Triers.

OBJECT, in philosophy, something apprehended, or presented to the mind, by sensation or by imagination.

Chauvinus defines an object to be that about which a power, act, or habit is employed: thus, good is the object of the will, truth of the understanding; and, in like manner, colour is the object of sight, sound of hearing, &c.

Objects are usually divided into next, *proxima*, which are those the power or habit is immediately employed on; in which sense, colour is the next object of sight: and remote, which are those only perceived by means of the former; in which sense the wall is the remote object of sight, since we only see it by means of its colour, &c. Ideas are the immediate objects of the mind, in thinking; bodies, their relations, attributes, &c. are the mediate objects. Hence it appears, that there is a sort of subordination of objects. But let it be observed that a next object with regard to a remote one, is properly a subject, not an object. See the article **SUBJECT**.

The schools also distinguish objects *per se*, being properly such as move or affect our senses; such are the sensible qualities: and objects *per accidens*, which are substances, and only affect us by being invested with sensible qualities. Again, they distinguish between common objects, such as affect divers senses, as motion, figure, &c. and proper objects, which affect only one sense.

Object is also used for the matter of an art or science, or that about which it is employed; in which sense, it also coincides with subject.

The schools distinguish divers kinds of objects in the same science, as material object, formal object, *objectum quod complexum*, *objectum quod incomplexum*, &c.

OBJECT GLASS of a telescope, or microscope, the

the glass placed at the end of the tube which is next the object. See the articles TELESCOPE and MICROSCOPE.

OBJECTION, something urged to overthrow a position, or a difficulty raised against an allegation, or proposition of a person we are disputing withal.

OBJECTIVE is used, in the schools, in speaking of a thing which exists no otherwise, than as an object known. The existence of such a thing is said to be objective.

This word is also used for the power, or faculty, by which any thing becomes intelligible; and for the act itself, whereby any thing is presented to the mind and known.

OBIT, among christians, a funeral solemnity, or office for the dead, most commonly performed when the corpse lies in the church uninterred.

It likewise signifies the anniversary office, or annual commemoration of the dead, performed yearly on the day of their death, with prayers, aims, &c. In religious houses they have a register, in which they enter the obits of their founders, or benefactors, which is thence termed the obituary.

OBLATI, in church-history, were secular persons, who devoted themselves and their estates to some monastery, into which they were admitted as a kind of lay-brothers. The form of their admission, was, putting the bell-ropes of the church round their necks, as a mark of servitude. They wore a religious habit, but different from that of the monks.

Oblati, in France, were a kind of lay-monks, antiently placed by the king in all the abbeys and priories belonging to the crown; to whom the religious were obliged to give a monk's allowance, on account of their ringing the bells, sweeping the church, &c. These places were usually filled with lame soldiers, some of whom had pensions without performing any duty. But these oblats with their pensions, have since been removed to the hôtel of the invalids at Paris.

OBLATION, a sacrifice, or offering made to God. See the article SACRIFICE.

In the canon-law, oblations are defined to be any thing offered by godly christians to God and the church, whether moveables or immoveables. There were antiently several kinds of those, as oblationes altaris, which were given to the priest for saying mass: oblationes

defunctorum, given by the last will of the deceased, to the church: oblationes mortuorum, those given by the relations of the dead at their burials; oblationes poenitentium, those given by penitents; and oblationes pentecostales, or whitsuntide-offerings. Till the fourth century, the church had no fixed revenues, the clergy wholly subsisting on voluntary oblations. Oblations are now in the nature of tythes, and recoverable in the ecclesiastical courts.

OBLIGATION, in general, denotes any act whereby a person becomes bound to another, to do something; as to pay a sum of money, be surety, or the like.

Obligations are of three kinds, viz. natural, civil, and mixed. Natural obligations are entirely founded on natural equity; civil obligation, on civil authority alone, without any foundation in natural equity; and mixed obligations are those which being founded on natural equity, are further enforced by civil authority.

In a legal sense, obligation signifies a bond, wherein is contained a penalty, with a condition annexed for the payment of money, &c. The difference between it and a bill is, that the latter is generally without a penalty or condition, though it may be made obligatory: and obligations are sometimes by matter of record, as statutes and recognizances. See the article BOND.

OBLIQUATION, or *Cathetus of OBLIQUATION*. See CATHETUS.

OBLIQUE, in geometry, something asslant, or that deviates from the perpendicular. Thus an oblique angle, is either an acute or obtuse one, i. e. any angle except a right one. See the article ANGLE.

OBLIQUE ASCENSION, in astronomy. See the article ASCENSION.

OBLIQUE CASES, in grammar, are all the cases except the nominative. See CASE.

OBLIQUE DESCENSION, in astronomy. See the article DESCENSION.

OBLIQUE LINE, that which, falling on another line, makes oblique angles with it, viz. one acute, and the other obtuse.

OBLIQUE PERCUSSION, in mechanics. See the article PERCUSSION.

OBLIQUE PLANES, in dialling, are those which recline from the zenith, or incline towards the horizon. See the articles DIAL and PLANE.

The obliquity, or quantity of this inclination, or reclination, may be found by means of a quadrant.

OBLIQUE

OBLIQUE SAILING, in navigation, is when a ship sails upon some rhumb between the four cardinal points, making an oblique angle with the meridian; in which case, she continually changes both latitude and longitude.

Oblique sailing is of three kinds, *viz.* plain-sailing, mercator's sailing, and great circle-sailing. See the article **NAVIGATION**.

OBLIQUE SPHERE, is where the pole is elevated any number of degrees less than 90° ; in which case, the axis of the world, the equator, and parallels of declination will cut the horizon obliquely. See the article **SPHERE**.

OBLIQUITY of the ecliptic. See the article **ECLIPTIC**.

OBLIQUUS, in anatomy, oblique, a name given to several muscles, particularly in the head, eyes, and abdomen. For the oblique muscles of the head, see the article **FRONTAL MUSCLES**.

The oblique muscles of the eye, called also rotatores, are two, a larger and a smaller. The first, which is also called obliquus superior, and trochlearis, the greater, upper, or trochlear oblique muscle of the eye, has its origin near the recti, and passes through a singular trochlea, of an almost cartilaginous structure, near the large canthus of the eye: from thence it again turns back, and is inserted into the upper part of the eye, near its middle: hence it obliquely depresses the pupil, and in some degree draws it outwards. The obliquus minor, the lesser oblique muscle of the eye, arises from the anterior and inner part of the orbit, not far from the nasal canal: it surrounds obliquely the lower part of the bulb, and is inserted into its exterior part, near the middle. Hence it moves the pupil of the eye obliquely upwards; but both these muscles acting together, draw it forwards, and thus they are the antagonists of the recti, which draw it backwards.

The oblique muscle of the ear, called also by some the semi-circularis, is one of the three muscles of the malleus, and is situated in the external and boney part of the ductus Eustachii; from whence passing a little upwards, and backwards through the canal, it is inserted into the large process of the malleus, and serves to relax and straiten, in various degrees, the membrane of the tympanum.

The oblique ascendants are, a pair of muscles of the abdomen, that arise from

the fifth rib to the eleventh, and terminate, by their aponeuroses, in the spine of the ileum, the os pubis, and the linea alba; however, several fibres pass thro' them. The oblique ascendants, are a pair of muscles that arise from the ossa ilei, the os sacrum, and the spines of the loins; and are inserted partly in the lower side of the spurious ribs, and partly in the linea alba. There is an annulus or ring in the lower part of the oblique descendents; and a perforation in the oblique ascendants, serving for giving passage to processes of the peritonæum, and the spermatic vessels in men, and to the ligamentum rotunda of the uterus in women.

OBLONG, in general, denotes a figure that is longer than broad: such is a parallelogram, ellipsis, &c. See the article **PARALLELOGRAM** and **ELLIPSIS**.

OBLONGATA MEDULLA, in anatomy. See **MEDULLA** and **BRAIN**.

OBOLUS, in antiquity, an antient athenian coin. See the article **COIN**.

Among antient physicians, obolus likewise denoted a weight, equal to ten grains. See the article **WEIGHT**.

OBREPTITIOUS, an appellation given to letters patent, or other instruments, obtained of a superior by surprize: or, by concealing from him the truth.

OBSCURA CAMERA. See **CAMERA**.

OBSCURE, something that is dark and reflects little light, or that is not clear and intelligible.

Obscurity, in this last sense, arises from hence, that we do not conceive and express things as they are, but as we judge them to be, ere we have fully examined them. See the articles **KNOWLEDGE**, **LANGUAGE**, **WORD**, &c.

OBSCURO, or **CLARO OBSCURO**. See the article **CLARO OBSCURO**.

OBSECRATION, in rhetoric, a figure whereby the orator implores the assistance of God, or man. Such is that of Palinurus, *Æn. vi. v. 363, seq.*

*Quod te per coeli jucundum lumen & auras,
Per genitorem oro, per spem surgentis Iuli;
Eripe me his, invicte, malis: &c.*

OBSEQUIES, the same with funeral solemnities. See the articles **BURIAL**, **FUNERAL**, &c.

OBSERVANCE, in a monastic sense, denotes a community of religious, tied to the perpetual observation of the same rule.

OBSERVATION, among navigators, signifies the taking the sun's, or the star's meridian

meridian altitude, in order thereby to find the latitude. See LATITUDE.

Coelestial OBSERVATIONS. See COELES-TIAL, and the following article.

OBSERVATORY, a place destined for observing the heavenly bodies; being, generally, a building erected on some eminence, covered with a terrace for making astronomical observations.

The more celebrated observatories are,
1. The Greenwich-observatory, built in 1676, by order of Charles II. at the solicitations of Sir Jonas Moor, and Sir Christopher Wren; and furnished with the most accurate instruments, particularly a noble sextant of seven feet radius, with telescopic sights.

The person to whom the province of observing was first committed, was Mr. J. Flamsteed; a man, who, as Dr. Halley expresses it, seemed born for the employment. For the space of fourteen years, with unwearied pains, he watched the motion of the planets; chiefly those of the moon, as it was given him in charge, that a new theory of that planet, exhibiting all irregularities, being found, the longitude might thence be determined.

In the year 1690, having provided himself with a mural arch, of seven feet diameter, well fixed in the plane of the meridian, he began to verify his catalogue of fixed stars, which hitherto had depended altogether on the distances measured with the sextant, after a new and very different manner; *viz.* by taking the meridional altitudes, and the moments of culmination, or the right ascension and declination. This instrument he was so pleased with, that he laid the use of the sextant almost wholly aside. Thus was the astronomer royal employed for thirty years; in the course of which time, nothing had appeared in public, worth so much expence and preparation; so that the observer seemed rather to have been employed for his own sake, and that of a few friends, than for the public: though it was notorious the observations that had been made, were very numerous, and the papers swelled to a great bulk.

This occasioned prince George of Denmark, in the year 1704, to appoint certain members of the royal society, *viz.* the honourable Francis Robarts, Sir Christopher Wren, Sir Isaac Newton, Dr. Gregory, and Dr. Arbuthnot, to inspect Flamsteed's papers, and choose out of

them such as they should think fit for the press; purposing to print them at his own expence: but, the patron of the work dying, before the impression was half finished, it lay still for some time; till at length it was resumed by order of queen Anne, and the care of the press committed to Dr. Arbuthnot, and that of correcting and supplying the copy, to Dr. Halley: such was the rise and progress of the *Historia Coelestis*; the principal part whereof is the catalogue of the fixed stars, called also the Greenwich-Catalogue. The Greenwich-Observatory is found, by very accurate observations, to lie in $51^{\circ} 28' 30''$ north latitude.

2. The parish-Observatory, built by the late Louis XIV, in the Fauxbourg St. Jaques.

It is a very singular, but withal a very magnificent building; the design of monsieur Perault: it is eighty feet high, and at top is a terrace.

The difference in longitude between this and the Greenwich-Observatory is $2^{\circ} 20'$ west.

In it is a cave, or cellar, 170 feet descent, for experiments that are to be made far from the sun, &c. particularly such as relate to congelations, refrigerations, indurations, conservations, &c.

3. Tycho Brahe's Observatory which was in the little island Ween, or Scarlet-Island, between the coasts of Schonen and Zeland, in the Baltic.

It was erected and furnished with instruments at his own expence, and called by him Uraniburg.

Here he spent twenty years in observing the stars: the result is his catalogue.

Mr. Gordon, in the Philosophical Transactions, observes, that this was none of the fittest places for some kind of observations, particularly the risings and settings; as lying too low, and being landlocked on all the points of the compass but three; and the land-horizon exceedingly rugged and uneven.

4. Pekin-Observatory; father Le Compte describes a very magnificent Observatory, erected and furnished by the late emperor of China, in his capital, at the intercession of some jesuits, missionaries, chiefly father Verbiest, whom he made his chief observer.

The instruments are exceedingly large; but the divisions less accurate, and the contrivance in some respect, less commodious than those of the Europeans:

The

The chief are an armillary, zodiacal sphere, of six Paris-feet diameter; an equinoctial sphere, of six feet diameter; an azimuthal horizon, six feet diameter; a large quadrant, six feet radius; a sextant, eight feet radius; and a celestial globe, six feet diameter.

OBSESSION, the being beset by an evil spirit, which without entering the body, torments, and, as it were, besieges the person from without; in which sense, it differs from possession.

The marks of obsession, according to some, are a being hoisted into the air, and thrown violently down without being hurt; speaking languages never learnt, having an aversion to all acts and offices of religion, &c. Some physicians look on all cases of obsession as natural, and curable by natural medicines, particularly purgatives and vomitives.

OBSIDIANUS Lapis, the **OBSIDIAN-STONE**. See the article **LAPIS**.

OBSIDIONALIS, an epithet applied by the Romans to a sort of crown. See the article **CROWN**.

OBSTRUCTION, in medicine, such an obturation of the vessels, as prevents the circulation of the fluids, whether of the sound and vital, or of the morbid and peccant kind, through them; arising from an excess of the bulk of the fluid to be transmitted, above the capacity of the vessel which ought to transmit it.

Such an obstruction, then, proceeds either from the narrowness of the vessels, or the excessive bulk of the fluids to be transmitted through them, or a concurrence of both these circumstances. The narrowness of the vessels is produced either by external compression, the proper contraction of the vessels themselves, or an increased thickness in their membranes. The bulk of the molecules of the blood is increased by the viscosity of the fluids, or by means of an error loci.

An obstruction may also proceed from a narrowness of the vessels in conjunction with a preternatural bulk of the molecules of the fluids.

The vessels may be externally compressed.

1. By an adjacent tumour, either of the plethoric, inflamed, purulent, schirrhous, cancerous, œdematous, encysted, steatomatous, atheromatous, melicerous, hydatidic, aneurismatic, varicose, tophous, pituitous, calculous, or callous kind.

2. By fractures, luxations, distortions, or distractions of the harder parts of the body, compressing the flexible and plient

vessels. 3. By every cause which preternaturally stretches and lengthens the vessels, whether by a tumour, or the pressure of a part when out of its natural situation, or by any external stretching force. 4. By external compressing causes, such as too tight cloths, bandages, the weight of an incumbent body pressing upon one particular part, and ligatures. This effect may also be produced by motion, attrition, and embracing other bodies, for when any part of the human body, is moved against an hard obstacle, the flexible vessels are necessarily compressed. An increased contraction, especially of the spiral fibres, and also of the longitudinal, lessens the cavities of the vessels; and this contraction arises first from every cause which increases the elastic force of the fibres, vessels, and viscera; secondly, from the tumour and preternatural distention of those minute vessels, by a contexture of which the sides of the larger vessels are formed; and thirdly, by a diminution of that cause which dilates the vessels whether for instance inanition or a languid state of the vessels. See **TUMOUR**, &c.

The thickness of the membranes of the vessels is increased first by every tumour happening in those vessels, by the union and contexture of which the membranes are formed; and secondly, by calluses, either of a cartilaginous, membranous, or bony nature, formed there.

The effects of an obstruction are various, according to the diversity of the obstructed vessel, and obstructing matter. In the sanguiferous arterial vessels, an inflammation of the first kind happens; in the dilated lymphatic arterial vessels, an inflammation of the second kind; in the larger lymphatic vessels, an œdema; in the smaller, pains without any apparent tumour; but in the pinguiferous, ossaceous, medullary, and biliary vessels, other disorders arise from an obstruction. See the article **INFLAMMATION**, &c.

When the different kinds of obstructions are distinctly known, it is no difficult matter to find a cure adapted to each. For that species of obstruction which arises from external compression indicates the removal of the compressing cause, if possible. That species of obstruction which arises from an increased contraction of the fibres may be removed, first, by such medicines as correct the too great contraction of the fibres, vessels, and viscera; secondly, and more especially,

cially, if their virtues have immediate access to the part affected, which advantage is principally to be obtained by fomentations, fumigations, baths, and ointments; thirdly, by such remedies as empty the too full vessels composing the membranes. This intention is answered by evacuants, in general, but especially by laxative, diluting, resolvent, attenuating, deterfive, and evacuant medicines applied to the vessels themselves; and fourthly, by such medicines as resolve callosities when formed. See the article FOMENTATION, &c.

The unfitness of the fluids for passing through the vessels, which depends upon their losing their spherical figure, may be known from an investigation of its causes, which are for the most part subjected to the senses. It is cured by such remedies as restore the spherical figure of the globules of the blood. Of this kind are all those things which increase the motion of the fluids through the vessels and viscera; such as all stimulating and corroborating medicines, as also brisk motion.

As the concretion and inspissation of the fluids arise from different causes, so it requires different methods of treatment, and different medicines according to the various conditions of the patient. And this diversity of causes, when investigated, will discover the most proper medicines, and the best method of using them. In general, the concretion of humours is removed first by the reciprocal motion of the vessels; secondly, by dilution; thirdly, by an attenuating fluid conveyed to the mass of blood mixed with it, and circulating along with it; and fourthly, by removing the coagulating cause.

The reciprocal motion of the vessels is procured first by such remedies as diminish the distending causes, such as venesection; secondly, by such medicines as corroborate the vessels; thirdly, by friction and muscular motion. See the article FRICTION.

The cause which coagulates the fluids, is removed by the influence of strongly attracting remedies, but when the fluids propelled into improper places become incapable of circulating, and by that means generate obstructions, many and violent disorders are produced: for which reason the source and cause from which they proceed ought to be carefully attended to. The cure is obtained, first by repelling the impacted matter with a

retrograde motion into larger vessels; secondly, by resolving it; thirdly, by relaxing the vessels; and fourthly, by suppuration. See SUPPURATION, &c. The impacted motion is repelled with a retrograde motion, first by evacuating the fluid which acts upon the impacted matter by a liberal and sudden venesection, by which means the obstructing matter is forced back by the effort of the contracted vessel; and secondly, by friction performed from the extremities of the bases of the vessels. See the article EVACUANTS, &c.

OBSTRUCTION of the bowels; OBSTRUCTION ALVI, in medicine. See the article COSTIVENESS.

OBSTRUENTS. See DEOBSTRUENTS.

OBTURATOR, in anatomy, a name for the two muscles of the thigh, one of which is the *marfupialis*, and is called obturator *internus*, and the other the obturator *externus*. These two muscles shut up the foramen or aperture between the os pubis and the hip-bone. The obturator *internus* comes from the internal circumference of the hole that is between the ischium and the os pubis; and passing thro' the sinuosity of the ischium, it is inserted into the dent of the great trochanter. Its tendon lies between the *gemini*: it turns the thigh to the outside. The obturator *externus* comes from the external circumference of the same hole as the former; it embraces the neck of the thigh-bone, and passes under the quadratus to the small cavity of the great trochanter.

OBTUSE, signifies blunt, dull, &c. in opposition to acute, sharp, &c. thus we say obtuse angle, obtuse angled triangle, &c. See the article ANGLE, &c.

OBVENTIONS, in antient law-books, signify the produce of a benefice, or spiritual living, including oblations, tithes, rents, and other revenues. See the article OBLATION, &c.

OBULARIA, in botany, a genus of the *didynamia angiospermia* class of plants, the corolla whereof is monopetalous, the tube is campanulated, ventricose, and pervious, the limb is divided into four patulous segments. The fruit is a roundish compressed ventricose capsule; formed of two valves, and containing several seeds, in form of a fine powder.

OBY, a great river of Russia, which rises in Kalmuck Tartary, and forms the boundary between Europe and Asia, till it falls into the frozen ocean, after it has

run a course of above two thousand miles.

OCCASIO, in antient law-writers, denotes a tribute which the lord imposed on his vassals or tenants, on occasion of war, or other exigencies.

OCCATION, a term in the antient husbandry, by which they expressed what we do by harrowing; though they performed it with a different instrument; being a kind of rake, with the teeth of which they levelled the ground, and broke the clods; and with the hand strewed the corn over this level ground. Then they brought on the plough and ploughed it in, so that the grain was sown in furrows, as we express it, and usually came up as we see it does at this time with us in the same case in the lower parts only. After it had got a few leaves they went over the ground again with the same instrument to clear away the weeds, and move the earth about the roots of the young plants.

OCCIDENT, in geography, the westward quarter of the horizon, or that part of the horizon where the ecliptic, or the sun therein, descends into the lower hemisphere, in contradistinction to orient. Hence we use the word occidental, for any thing belonging to the west, as occidental bezoard, occidental pearl, &c.

OCCIPITAL, in anatomy, a term applied to the parts of the occiput, or back part of the skull. See the articles OCCIPITIS OS, and SKULL.

OCCIPITALES, or the **OCCIPITAL MUSCLES**, arise on each side from the os occipitis, where it adheres to the temporal bones: they ascend upwards over the ossa bregmatis, and join their aponeuroses with the frontal ones, to which they seem to afford their fixed point: they, together with the frontal ones, cover the head as it were with a helmet, or cap, and they assist their actions. Morgagni has observed, that these occipital muscles are sometimes intirely wanting, and at others, when not absolutely deficient, that they are so thin that it is scarce possible to see them: sometimes also they are larger than usual, and are divided as it were each into two. It has been from an examination of them in some subject, in which they were of this kind, that Santorius makes two occipital muscles of each side.

OCCIPITIS OS, the **OCCIPITAL BONE**, in anatomy, the fourth bone of the

cranium, so called from its situation in the occiput, or back part of the skull. See the article SKULL.

Its figure resembles a lozenge, irregularly notched, or indented; being convex on the outside, and concave within. It is very thick, and has a protuberance about the middle of its convex side: it has also three apophyses, two of which are condyloide, serving for its articulation with the upper vertebra of the neck, whereby the whole head is supported.

OCCULT, something secret, hidden, or invisible. The occult sciences, are magic, necromancy, cabbala, &c.

OCCULT, in geometry, is used for a line that is scarce perceivable, drawn with the point of the compasses, or a leaden pencil. These lines are used in several operations, as the raising of plans, designs of building, pieces of perspective, &c. They are to be effaced when the work is finished.

OCCULTATION, in astronomy, the time a star or planet is hid from our sight, by the interposition of the body of the moon, or of some other planet. See the article ECLIPSE.

Circle of perpetual OCCULTATION, is a parallel in an oblique sphere, as far distant from the depressed pole, as the elevated pole is from the horizon. See the article HORIZON.

All the stars between this parallel and the depressed pole, never rise, but lie constantly hid under the horizon of the place.

OCCUPANT, in law, the person that first seizes, or gets possession of a thing; and this by law must be of what has a natural existence, as of land, &c. A person cannot be an occupant of a void possession. Where the tenant, for the term of another's life, dies, the *celui qui vie* being alive, or in case a tenant for his own life, grants over his estate to another, and the grantee dies before him, there shall be an occupant, unless the grant be made also to the grantee's heirs during the term, &c. By statute it is ordained, that an estate, *pur autre vie*, may be devised by will; and if no devise thereof is made, whereby the heir becomes special occupant, it shall be assets in his hands to pay debts, &c. or for want of such heir, it is to go to the executors or administrators of the person who had the estate.

OCCUPATION, in a legal sense, is taken for use or tenor, as in deeds it is frequently

quently said, that such lands are or lately were in the tenure or occupation of such a person. This is likewise used for a trade or mystery.

OCCUPATION, or **OCCUPANCY**, in the civil law, denotes the possession of such things as at present properly belong to no private person; but are capable of being made so, as by seizing or taking of spoils in war, by catching things wild by nature, as birds and beasts of game, &c. or by finding things before undiscovered, or lost by their proper owners.

OCCUPAVIT, in law, a writ which issues for a person that is ejected out of an estate of inheritance in time of war.

OCCUPIERS of WALLING, a term in the salt-works for the persons who are the sworn officers that allot, in particular places, what quantity of salt is to be made, that the markets may not be overstocked, and see that all is carried fairly and equally between the lord and the tenant.

OCEAN, in geography, that vast collection of salt and navigable waters, in which the two continents, the first including Europe, Asia, and Africa, and the last America, are inclosed like islands. The ocean is distinguished into three grand divisions. 1. The Atlantic ocean, which divides Europe and Africa from America, which is generally about three thousand miles wide. 2. The pacific ocean, or South-sea, which divides America from Asia, and is generally about ten thousand miles over: and, 3. The Indian ocean, which separates the East-Indies from Africa, which is three thousand miles over. The other seas, which are called oceans, are only parts or branches of these, and usually receive their names from the countries they border upon.

For the saltness, tides, &c. of the ocean, see the articles **SEA**, **TIDES**, &c.

OCHLOCRACY, *οχλοκρατεια*, that form of government wherein the populace has the chief administration of affairs.

OCHNA, in botany, a genus of the polyandria-monogynia class of plants, the flower of which consists of five roundish petals, and its fruit is a very large, truncated, and fleshy receptacle, containing on each side a single berry, with a single oval seed.

OCHRE, *ochra*, in natural history, a genus of earths, slightly coherent, and composed of fine, smooth, soft, argilla-

ceous particles, rough to the touch, and readily diffusible in water.

Ochres are of various colours, as red, yellow, blue, brown, green, &c. Of the red there are eleven species, of the yellow as many, of blue one, of brown two, of green one, and of black two. All which have, at one time or other, been used in painting.

The earths of this kind, used in medicine, are only three. 1. A yellow kind, described by Dioscorides under the name of *ochra attica*, and esteemed a very valuable external medicine in inflammations and tumours, applied in form of a cataplasm. 2. The deep red kind, called *rubrica sinopica*, and said to be an excellent astringent, and consequently good in diarrhoeas, dysenteries, and hæmorrhages of all kinds. 3. The species of ochre, called *lapis armenus*. See **LAPIS**.

OCHRIDA, or **LOCHRIDA**, a town of european Turkey, in the province of Albania, 110 miles west of Salonichi: east long. 21° , north lat. 41° .

OCHSENFURT, a town of Franconia, in Germany, twelve miles south-east of Wurtzburg.

OCIMUM, or **OCYUM**, **BASIL**, in botany, a genus of the didynamia-gymnospermia class of plants, with a bilabiated cup: its flower is monopetalous and ringent; and its seeds, which are four in number, are contained in the cup, which closes for that purpose.

Both the herb and seeds of basil are used in medicine, and are said to be good in disorders of the lungs, and to promote the menses.

OCKA, a great river of Muscovy, which joins the river Mosco at Kolomna.

OCKER, or **OCCA**, a river of Germany, which, rising in the southern part of the dutchy of Brunswic, runs north, and passing by Wolfembutte and Brunswic, falls into the river Aller.

OCKINGHAM, a market-town of Berkshire, seven miles east of Reading.

OCTAETERIDES, in chronology, denotes a cycle of eight years, at the end of which three entire lunar months were added.

This cycle was in use at Athens, till Meton discovered the golden number. See the article **GOLDEN NUMBER**.

OCTAGON, or **OCTOGON**, in geometry, is a figure of eight sides and angles: and this, when all the sides and angles are equal, is called a regular octagon,

or one which may be inscribed in a circle. If the radius of a circle circumscribing a regular octagon be $=r$, and the side of the octagon $=y$; then $y=$

$$\sqrt{2r^2 - r\sqrt{2r^2}}$$

OCTAGON, in fortification, denotes a place that has eight bastions. See the article **FORTIFICATION**.

OCTAHEDRON, or **OCTAEDRON**, in geometry, one of the five regular bodies, consisting of eight equal and equilateral triangles. See the article **SOLID**.

The square of the side of the octahedron is to the square of the diameter of the circumscribing sphere, as 1 to 2.

If the diameter of the sphere be 2, the solidity of the octahedron inscribed in it will be 1,33333, nearly.

The octahedron is two pyramids put together at their bases, therefore its solidity may be found by multiplying the quadrangular base of either of them, by one third of the perpendicular height of one of them, and then doubling the product.

OCTANDRIA, in botany, one of the classes of plants established by Linnæus, the eighth in order; the characters of which are, that all the plants comprehended in it have hermaphrodite flowers, and eight stamina or male parts in each. See the article **BOTANY**.

It is sub-divided into orders, which are denominated from the number of pistils contained in each flower; thus the octandria monogynia contain eight stamina, and only one pistil; the octandria digynia, eight stamina, and two pistils; and so on, trigynia; tetragynia, &c. denoting three, four, &c. pistils.

OCTANT, or **OCTILE**, in astronomy, that aspect of two planets, wherein they are distant an eighth part of a circle, or 45° from each other. See **ASPECT**.

OCTAPLA, in matters of sacred literature, denotes a polyglot bible, consisting of eight columns, and as many different versions of the sacred text, viz. the original Hebrew both in hebrew and greek characters, greek versions, &c.

OCTATEUCH, an appellation given to the eight first books of the Old Testament. See the article **CANON**.

OCTAVE, in music, an harmonical interval, consisting of seven degrees, or lesser intervals. See the article **INTERVAL**.

The most simple perception that we can have of two sounds, is that of unisons; in regard, the vibrations there begin and end together. The next to this is the

octave, where the more acute sound makes precisely two vibrations, while the grave or deeper one makes one; and wherein, by consequence, the vibrations of the two meet at every vibration of the more grave one. Hence unison and octave pass almost for the same concord: hence also the proportion of the two sounds that form the octave are in numbers or in lines, as 1 : 2; so that two chords, or strings of the same matter, thickness, and tension, one whereof is double the length of the other, produce the octave.

The octave is called among the antient authors the diapason, because containing all the simple tones and chords; all of which derive their sweetness from it, as they rise more or less directly out of it. To be just, it must contain diatonically seven degrees or intervals, and consequently eight terms or sounds; whence it is called by the name of octave.

The octave containing in itself all the other simple concords, the degrees being the difference of those concords; it is evident, the division of the octave comprehends the division of all the rest. By joining therefore all the simple concords to a common fundamental, we have the following series :

$$1 \quad \frac{5}{6} \quad \frac{4}{5} \quad \frac{3}{4} \quad \frac{2}{3} \quad \frac{5}{8} \quad \frac{3}{5} \quad \frac{1}{2}$$

Fun. 3dl. 3d gr. 4lh. 5th. 6 less. 6 gr. 8ve.

Again, the system of the octave, containing all the original concords, and the compound concords being the sum of the octave, and some lesser concord; in order to have a series to reach beyond an octave, we must continue them in the same order through a second octave, as in the first, and so on to a third and fourth octave. Such a series is called the scale of music. See the article **SCALE**.

The composition of octaves may be carried on infinitely, yet three or four is the greatest length we go in ordinary practice. The old scales went but to two, or at most to three octaves, which is the full compass of an ordinary voice. When we say that the antient scales went but to two, or at furthest to three octaves, we do not mean that they were not allowed to exceed that compass; but that between the extremes of a double, or triple octave, were contained all the variety that was possible or needful; for even then, an active musician would take the liberty to surprize them, by running through greater extremes.

Notwithstanding the perfection of the octave, yet after the third, the agreement dimi-

diminishes very fast; nor do they ever go so far at one movement as from one extreme to the other of a double or triple octave; seldom beyond a single one; nor is either voice or instrument well able to go beyond. To form a fourth octave, if the acuter string be half a foot long, which is but a small length to render a clear sound, the graver must be eight feet. If then we would go beyond a fourth octave, either the acute string would be too short, or the grave one too long; not but this inconvenience is remedied by a greater tension of each.

The octave is not only the greatest interval of the seven original concords, but the first in perfection; as it is the greatest interval, all the lesser concords are contained in it: indeed, the manner wherein the lesser are found in an octave, is somewhat extraordinary, *viz.* by taking both an harmonical and arithmetical mean between the extremes of the octave, and then both an arithmetical and harmonical mean between each extreme, and the most distant of the two means last found, *i. e.* between the less extreme and the first arithmetical, and between the greatest extreme and the first harmonical mean, you will have all the lesser concords.

Nicomachus, disciple of Pythagoras, says, that to produce an octave, take two chords and stretch the one by a weight of six pounds, and the other by one of twelve; the sound of the last will be an octave to that stretched by the six pound weight; and from thence proceeds to fix the proportion of weights to be used for the production of the other intervals.

Mr. Malcolm observes, that any wind-instrument being over-blown, the sound will rise to an octave, and no other concord, which he ascribes to the perfection of the octave, and its being next to unison. From the simple and perfect form of the octave arises this peculiar property, that it may be doubled and tripled, and still be concord; that is, the sum of two or more octaves are concord; though the more compound become gradually less agreeable; he adds, that there is such an agreement between its extremes, that whatever sound is concord to one, is so to the other.

Des Cartes, from an observation of the same kind from an organ-pipe, concludes, that no sound is heard, but its acute octave seems some way or other to echo in the ear.

The antient grecian system had no greater compass than a double octave, or fifteenth, which they called *dis diapason*. In thorough bass, the octave and its replies are marked by a simple (8). In melody, the voice or sound of an instrument may move an octave *per salto*, but very seldom two octaves, especially the voice. In harmony, two octaves should never follow one another, if differing in degree of tune *per salto* of a fifth or other interval; but it may be followed by any of the other concords, perfect or imperfect. See the article CONCORD.

OCTAVE, in law, signifies the eighth day inclusive after any feast.

OCTILE, or OCTANT. See OCTANT.

OCTOBER, in chronology, the tenth month of the julian year, consisting of thirty-one days: it obtained the name of October from its being the eighth month in the calendar of Romulus. See the articles MONTH and YEAR.

OCTOGON, or OCTAGON. See the article OCTAGON.

OCTOSTYLE, in the antient architecture, is the face of an edifice adorned with eight columns.

The eight columns of the octostyle may either be disposed in a right line, as in the Pantheon, and the pseudodiptere temple of Vitruvius; or in a circle, as in the round monothere temple of Apollo Pythius at Delphi, &c.

OCULUS, the eye, in anatomy. See the article EYE.

OCULUS BELI, in natural history, one of the semi-pellucid gems, of a greyish-white colour, variegated with yellow, and with a black central nucleus: it is of a roundish form, and its variegations very beautifully represent the pupil and iris of the eye: whence the name.

OCULUS CATI. See the article ASTERIA.

OCULUS LEPORINUS, in surgery, the same with ectropium. See ECTROPIUM.

OCULUS MUNDI, one of the semi-pellucid gems, of a whitish-grey colour, without any variegations.

OCYUM, or OCIMUM, in botany. See the article OCIMUM.

OCZAKOW, a port town of european Turkey, the capital of Budziac Tartary: east long. 35°, north lat. 46°.

ODA, in the turkish seraglio, signifies a class, order, or chamber. The grand seignior's pages are divided into five classes or chambers. The first, which is the lowest in dignity, is called the great oda, from the great number of persons that compose

compose it: these are the juniors, who are taught to read, write, and speak the languages. The second is called the little oda, where from the age of fourteen or fifteen years, till about twenty, they are trained up to arms, and the study of all the polite learning the Turks are acquainted with. The third chamber, called kilar-oda, consists of two hundred pages, which, besides their other exercises, are under the command of the kilardgi-bachi, and serve in the pantry and fruitery. The fourth consists only of twenty-four, who are under the command of the khazineda-bachi, and have charge of the treasure in the grand signior's apartment, which they never enter with cloaths that have pockets. The fifth is called kas-oda, or privy-chamber, and is composed of only forty pages, who attend in the prince's chamber. Every night eight of these pages keep guard in the grand seignior's bed-chamber, while he sleeps: they take care that the light, which is constantly kept in the room, does not glare in his eyes, lest it should awake him; and if they find him disturbed with troublesome dreams, they cause him to be awaked by one of their agas.

ODA-BACHI, or **ODDOBASSI**, among the Turks, an officer equivalent to a serjeant or corporal among us. The common soldiers and janizaries, called oldachis, after having served a certain term of years, are always preferred, and made biquelars; and from being biquelars, they in time become odabaehis; that is, corporals of companies, whose numbers are not fixed; being sometimes ten, and sometimes twenty.

Their pay is six doubles per month, and they are distinguished by a large felt a foot broad, with two large ostrich-feathers.

ODE, in poetry, a song, or a composition proper to be sung.

Among the antients, odes signified no more than songs; but with us they are very different things. The antient odes were generally composed in honour of their gods, as many of those of Pindar and Horace.

These had originally but one stanza, or strophe, but afterwards they were divided into three parts, the strophe, the antistrophe, and the epode. The priests going round the altar singing the praises of the gods, called the first entrance,

when they turned to the left, the strophe; the second, turning to the right, they called antistrophe, or returning; and, lastly, standing before the altar, they sung the remainder, which they called the epode. See the articles **ANTISTROPHE**, **STROPHE**, &c.

Heroes and triumphs were also subjects for the ode; and in course of time love and entertainments were likewise thought very suitable to it. Here Anacreon and Sappho excelled, and Horace has left us some of both sorts wrote with peculiar sweetness and elegance. Among the moderns, Dryden's ode on St. Cecilia's day, and Pope's on the same subject, are justly allowed to exceed every thing of the kind, either in this, or in any of the modern languages.

The distinguishing character of an ode is sweetness; the poet is to soothe the minds of his readers by the variety of his verse, and the delicacy of words; the beauty of numbers, and the liveliness of expressions: for variety of numbers is essential to the ode. At first, indeed, the verse of the ode was but of one kind, but for the sake of pleasure, and to adapt it to music, the poets so varied the numbers and feet, that their kinds are now almost innumerable. One of the most considerable is the Pindaric, distinguished by its boldness, and the rapidity of its flights.

An ode may either be sublime or of the lower strain, jocose or serious, mournful or exulting, even sometimes satirical, but never epigrammatical; and, in short, it may consist of wit, but not of that turn which is the peculiar characteristic of an epigram.

ODENSEE, the capital of Funen, one of the largest of the danish islands in the Baltic, situated seventy-two miles west of Copenhagen.

ODER, a river which rises in the carpathian mountains, on the confines of Hungary, runs through Silesia and Brandenburg, and then separating the eastern from the western Pomerania, divides itself into several channels, and falls into the Baltic sea.

ODER is also a town of Silesia, situated on the river of the same name: east long. $17^{\circ} 17'$, north lat. $49^{\circ} 45'$.

ODERBERG, a town in the dutchy of Silesia, in Bohemia, situated on the river Oder: east long. $17^{\circ} 45'$, north lat. $50^{\circ} 6'$.

ODERN

ODERNHEIM, a town of Germany, in the palatinate of the Rhine, fifteen miles south of Mentz.

ODEUM, in grecian antiquity, a music-theatre, built by Pericles, the inside of which was filled with seats and ranges of pillars, and on the outside the roof descended shelving downwards from a point in the center, with many bendings, in imitation of the king of Persia's pavillion. Here the musical prizes were contended for, and here also, according to Aristophanes, was a tribunal.

ODIHAM, a market-town of Hampshire, twenty miles north-east of Winchester.

ODIO ET ATIA, a writ antiently directed to the sheriff, to enquire whether a person committed to prison on suspicion of murder, was justly committed, or whether it was done through malice; and if this last appeared to be the case, there issued another writ to the sheriff to bail him.

ODONTALGIA, the **TOOTH-ACH**, in medicine. See the article **TOOTH-ACH**.

ODONTOIDE, in anatomy, an appellation given to a process of the second vertebra of the neck, from its resemblance to a tooth. See **VERTEBRÆ**.

ODOR, or **ODOUR**. See **SMELL**.

ODOROUS, or **ODORIFEROUS**, appellations given to whatever smells strongly, whether they be fetid or agreeable; but chiefly to things whose smell is brisk, and agreeable.

ODYSSEE, *οδυσεα*, a celebrated epic poem of Homer, wherein are related the adventures of Ulysses, in his return from the siege of Troy. See the articles **EPIC** and **ILIAD**.

The moral of the *odyssee* is, that a person's absence from home, so that he cannot have an eye to his affairs, occasions great disorders; and, accordingly, the hero's absence is the principal and most essential action of the whole poem. This poem, adds Bossu, is better calculated for the people than the *iliad*, where the subjects suffer rather from the bad conduct of their princes, than by their own fault: whereas the meanest people are as liable to ruin their estates and families by negligence, as the greatest princes; and, consequently, have as much need of Homer's lectures, and are as capable of profiting by them, as kings themselves.

OECONOMICS, the art of managing the affairs of a family, or community; and hence the person who takes care of the revenues and other affairs of churches,

monasteries, and the like, is termed *oeconomus*.

OECONOMY, *οικονομια*, denotes the prudent conduct, or discreet and frugal management, whether of a man's own estate, or that of another.

Animal OECONOMY, comprehends the various operations of nature, in the generation, nutrition, and preservation of animals. See the articles **GENERATION**, **NUTRITION**, &c.

The doctrine of the animal oeconomy is nearly connected with physiology, which explains the several parts of the human body, their structure, use, &c.

OECUMENICAL, signifies the same with general, or universal; as oecumenical council, bishop, &c. See the articles **COUNCIL** and **BISHOP**.

OEDEMA, or **PHLEGMATIC TUMOUR**, in medicine and surgery, a sort of tumour attended with paleness and cold, yielding little resistance, retaining the print of the finger when pressed with it, and accompanied with little or no pain. See the article **TUMOUR**.

This tumour obtains no certain situation in any particular part of the body, since the head, eye-lids, hands, sometimes part, sometimes the whole body, is afflicted with it. When the last mentioned is the case, the patient is said to be troubled with a cachexy, leucophlegmatia, or dropsy. See the article **CACHEXY**, &c. But if any part of the body is more subject to this disorder than another, it is certainly the feet, which are at that time called swelled or oedematous feet. We shall treat distinctly of them in this place, that it may appear what is the true nature and rational method of phlegmatic tumours in whatever part of the body they shall be found.

The proximate cause of an oedema, says Heister, is doubtless to be found in the too great serosity or viscosity of the blood, which stagnates in the very minutest vesicles of the fat, or tunica cellulosa, and by this means stretches out the skin, with which it is immediately covered. This vitiated state of the blood chiefly arises in men who are either of a cold and phlegmatic habit of body, or are advanced in years. It chiefly falls upon them in cold weather, or in the winter, when the inclemency of the season heightens the disorder of nature. Another cause of this disorder is an irregularity in diet, by over-eating or drinking, and by the constant use of crude, cold, and hard meats.

Inter-

Intermitting fevers or agues conduce very much to this disorder, especially if the patient indulges himself in an intemperate use of cooling liquors, while the fit is upon him, and his thirst urgent: the disease frequently owes its rise to too plentiful a discharge of blood from a wound, the nose, or any other way; and sometimes to obstructions of the menstrual discharge in women, or to a compression of the *vena cava* by the weight of the foetus in women far gone with child; or by any scirrhus body in the abdomen, which greatly hinders the return of the blood from the lower limbs; or to too sedentary a way of life; or too great an indulgence in lying in bed; or, lastly, to a phthisis and difficulty of breathing; or to any disorder or fatigue of body, which disturbs or destroys the natural force of the heart in maintaining the circulation with due vigour.

From what has been said it plainly appears by what signs an oedema manifests itself: therefore this observation alone remains to be added, that the harder the tumour is, and the longer the pitting which is made by the finger remains visible, the stagnating fluid is in such proportion thicker, and more tenacious.

The method of treating oedematous tumours is very different, according to the different causes to which they owe their rise: therefore we are first to make diligent search after the genuine cause of the disorder, before we attempt its cure.

The external method of treating these tumours in the legs and feet, is usually to have recourse to frequent frictions with warm cloths, to be repeated evening and morning till the part grows red and hot; then the limbs are to be diligently preserved from the injuries of the cold air, by wearing stockings made of some warm fur, and at night keeping hot bricks about the legs and feet. After this there is a proper bandage to be applied, which is to ascend gradually from the feet up to the knees. The first step towards a cure by internal medicines, according to Junker, must be the correcting the mucous and viscid state of the humours by the neutral salts, as tartarum vitriolatum, and the like; and by gum ammoniacum, the roots of pimpernel, and woods of saffraass, guaiacum, and the like; with the warm aromatics, as ginger and the spices, and carminative seeds; the matter when thus attenuated is to be evacuated by purges of a strength propor-

tioned to the constitution of the patient. After the use of these internal and the external medicines just before mentioned, Heister thinks it proper to use strengthening remedies externally; for which end, the limb is to be placed over burning rectified spirits of wine, wrapping it up in cloths, in such a manner as it may receive the steam. This will incline the stagnating fluids to escape through the skin, or render them fit to return into the circulation, and at the same time restore the natural tone of the limb. See the article OBSTRUCTION.

OEDENBURG, or EDENBURG, a town of Hungary, thirty miles south of Vienna.

OELAND, a swedish island in the Baltic sea, between the continent of Gothland, and the isle of Gothland: east long. 16° , north lat. between 56° and $57^{\circ} 30'$.

OELFELD, a town in the dutchy of Magdeburg and circle of Lower Saxony, in Germany, twenty miles east of Brunswick.

OENANTHE, WATER-DROPWORT, in botany, a genus of the pentandria-digynia class of plants, with a radiated flower; the lesser hermaphrodite ones of the disc being composed of five inflexo-cordated petals: the fruit is composed of two oblong seeds, convex and striated on one side, and plane on the other.

A species of this plant, called the hemlock-dropwort, with all the leaves multifid and obtuse, is a terrible poison.

OENANTHE, in ornithology, a species of motacilla, with a grey back and white forehead, frequent in many parts of England, and much esteemed at table: it is otherwise called vitiflora, the fallow-finch, and wheat-ear; being about the bigness of the sparrow. See the article MOTACILLA.

OENAS, a name used by some authors for the wood-pigeon, or bluish columba, with a blackish spot on the wing. See the article COLUMBA.

OENELÆUM, in pharmacy, a mixture of wine and oil, usually of thick black wine and oil of roses; said to be good for anointing wounds, to prevent an inflammation. See WINE and OIL.

OENOPTÆ, in grecian antiquity, a kind of censors at Athens, who regulated entertainments, and took care that none drank too much or too little.

OENOTHERA, the PRIMROSE of VIRGINIA, in botany, a genus of the octandria-monogynia class of plants, the flower of

of which consists of four obversely cordated petals: the fruit is a cylindrical capsule, with four low angles, being formed of four valves, and containing four cells, with numerous angulated seeds.

OESSEL, an island at the entrance of the bay of Livonia, in the Baltic sea; situated in 22° of east longitude, and 58° of north latitude.

OESOPHAGUS, in anatomy, the gūla, or gullet, is a membranaceous canal, reaching from the fauces to the stomach, and conveying into it the food taken in at the mouth. Its figure is somewhat like that of a funnel, and its upper part is called by anatomists the pharynx. Its situation is almost exactly behind the aspera arteria, and longitudinally with the vertebræ of the neck and back; but when it enters the cavity of the thorax, it turns a little to the right, on account of the aorta. Its substance is composed of five coats, of which the first is membranaceous, and is continuous with the pleura in the thorax. The second is robust and muscular; and, in the human body, is composed of a double stratum of fibres: those of one series longitudinal, and those of the other circular. The third coat is cellular, much like that of the intestines. The fourth is nervous, and divisible into a number of other lamellæ, and furnished with a multitude of glands and vessels: hence it is divided by Verheyen into two, under the names of a vasculous and glandulous coat: this is continuous with the interior membrane of the mouth and stomach. The fifth is villose, and is called *crusta villosa*: this is always covered with a mucous liquor.

The muscles of the pharynx serve to open and shut the oesophagus. See the article **PHARYNX**.

The arteries of the oesophagus are from the carotids, the aorta, the intercostals, and the coeliac. The veins are from the jugulars, the azygos, and the coronary vein of the stomach; and the nerves from the par vagum. There are also certain excretory ducts, called *ductus excretorii novæ Vercelloni*, which arise from the glands, and convey a saltish liquor into the oesophagus and stomach. The glands, from which these have their origin, are of three kinds: 1. The gastric glands, which are conglomerate, and are situated near the left orifice of the stomach. 2. The dorsal ones, which are situated near

the fifth vertebra of the thorax. And, 3. The bronchial, tracheal, and thyroïde. The use of the oesophagus is for deglutition, and a commixtion of the liquid serving for digestion.

OESTRUM VENERIS, in anatomy, a name by which some call the clitoris. See the article **CLITORIS**.

OESTRUS, in zoology, a genus of two-winged flies, the mouth of which is a simple fissure, without either teeth or proboscis.

To this genus belong the breeze or gad-fly, the grey trumpet-fly, &c. distinguished by the different variegations of their colours.

OETING, the capital of the county of the same name, in the circle of Swabia, in Germany: east long. $10^{\circ} 35'$, and north lat. 49° .

OFFENBURG, a free imperial city of the circle of Swabia, in Germany, situated on the river Kintzig: east long. $7^{\circ} 40'$, and north lat. $48^{\circ} 30'$.

OFFENCE, *delictum*, in law, an act committed against the law, or omitted where the law requires it.

Offences are distinguished into two kinds, *viz.* such as are capital, and such as are not. Capital offences are those for which the offender is to lose his life. Those not capital, where the offender may forfeit his lands, and goods; be fined, or suffer corporal punishment, or both, but not lose his life. Under capital offences are comprehended high-treason, petit-treason, and felony: and offences not capital include the remaining part of the pleas of the crown, and come under the title of misdemeanours. Some offences are punishable by the common law, but most of them by statutes.

OFFICE, a particular charge or trust, or a dignity attended with a public function. The word is primarily used in speaking of the offices of judicature and policy; as the office of a secretary of state, the office of a sheriff, of a justice of peace, &c. See **SECRETARY**, &c.

Every subject is, in general, esteemed capable of an office, except a minor; but if an office, for the execution of justice, be granted to a person who has not the previous knowledge necessary for his executing it, the grant thereof is void: and no person, though he be ever so well qualified, can have a judicial office in reversion. The king cannot grant any office to the prejudice of another's freehold in his office, for this is contrary to law; and

therefore the judges have refused to admit an officer, though commanded by the king's sign manual. Antient offices must be granted in the antient manner; nor can a new office be erected, or an old one be entitled to new fees, without an act of parliament. It is enacted, that no officer, or minister of the king, shall obtain his place or office on account of any gift, favour, or affection; and if the officers of justice, or those belonging to the treasury, &c. shall sell any of the offices in their gift, or take any money, profit, or reward for them, they shall forfeit their estates therein; and the person so buying is rendered incapable of enjoying such office: but this does not extend to the two chief justices, or to the judges of the assize, who may grant offices as before the act, 5 & 6 Edw. VI. c. 16. It is observed, that several offices were never intended for the use of one person; but offices of trust are to be personally executed, and cannot be assigned to others. A public office by non-user becomes forfeited: but it is not so in the case of a private office, unless some special damage be received.

OFFICE also signifies a place or apartment appointed for officers to attend in, in order to discharge their respective duties and employments: as the secretary's office, office of ordnance, excise-office, signet-office, paper-office, pipe-office, six-clerks-office, &c. for the respective duties of each, see the articles SECRETARY, ORDNANCE, EXCISE, &c.

OFFICE, in architecture, denotes all the apartments appointed for the necessary occasions of a palace or great house, as kitchens, pantries, confectionaries, &c.

OFFICE, in the canon-law, is used for a benefice that has no jurisdiction annexed to it.

It is also used for divine service, celebrated in public: and in the romish church it is applied to a particular prayer preferred in honour of some saint: thus, when any saint is canonized, a particular office is at the same time assigned him, out of the common office of the confessors, the virgin, or the like. We say the office of the Holy Spirit, of the Virgin, of the passion, of the holy sacrament, of the dead, &c.

OFFICE FOUND, in common law, is used for an inquisition made to the king's use, of any thing found, by virtue of his office who makes inquisition: hence, to traverse an office, is to traverse an

inquisition taken of office, before an escheator; and to return an office, is to return that which was found by virtue of the office.

By the common law, the king is not in possession of lands that are forfeited for treason, during the offender's life, without an office-found thereon; but the land, whereof a person attainted of high treason dies seized in fee, is actually vested in the king, though there be no office; for the blood being corrupted, the land cannot go by descent.

OFFICER, a person possessed of a post or office. See the preceding article.

The great officers of the crown, or state, are the lord high steward, the lord high chancellor, the lord high treasurer, the lord president of the council, the lord privy-seal, the lord chamberlain, the lord high constable, the earl marshal; each of which see under its proper article.

Commission-OFFICERS, are those appointed by the king's commission: such are all from the general to the cornet inclusive, who are thus denominated in contradistinction to warrant-officers, who are appointed by the colonel's or captain's warrant, as quarter-masters, serjeants, corporals, and even chaplains and surgeons.

Field OFFICERS are such as command a whole regiment, as the colonel, lieutenant-colonel, and major.

Flag-OFFICERS. See FLAG-OFFICERS, and ADMIRAL.

General-OFFICERS are those whose command is not limited to a single company, troop, or regiment; but extends to a body of forces, composed of several regiments: such are the general, lieutenant-general, major-generals, and brigadiers.

OFFICERS of the household. See the article HOUSEHOLD.

OFFICERS of justice, are those entrusted with the administration of justice.

OFFICERS of the mint. See MINT.

Municipal OFFICERS. See MUNICIPAL.

OFFICERS of police, are those in whom the government and direction of the affairs of a community are invested, as mayors, aldermen, sheriffs, &c.

Reformed OFFICERS. See REFORMADO.

Royal OFFICERS are those who administer justice in the king's name, as the judges, &c. See the article JUDGE.

Sea-OFFICERS, or *OFFICERS of the marine*, are those who command ships of war. See the article NAVY.

Staff-OFFICERS are such as, in the king's presence, bear a white staff, or wand; and

and at other times, on their going abroad, have it carried before them by a footman bare-headed: such are the lord steward, lord chamberlain, lord treasurer, &c.

The white staff is taken for a commission, and at the king's death each of these officers breaks his staff over the hearse made for the king's body, and by this means lays down his commission, and discharges all his inferior officers.

Subaltern-OFFICERS are all who administer justice in the name of subjects; as those who act under the earl marshal, admiral, &c. In the army, the subaltern officers are the lieutenants, cornets, ensigns, sergeants, and corporals.

OFFICIAL, in the canon-law, an ecclesiastical judge, appointed by a bishop, chapter, abbot, &c. with charge of the spiritual jurisdiction of the diocese. Of these there are two kinds; the one is as it were, the vicar-general of the diocese, and is called by the canonists *officialis principalis*, and in our statute law, the bishop's chancellor. There is no appeal from his court to the bishop, his being esteemed the bishop's court. See **BISHOP'S COURT**.

The other, called *officialis foraneus*, is appointed by the bishop, when the diocese is very large: he has but a limited jurisdiction, and has a certain extent of territory assigned him, wherein he resides. See the article **COMMISSARY**.

OFFICIAL is also a deputy appointed by an archdeacon, as his assistant, who sits as judge in the archdeacon's court.

OFFICINAL, in pharmacy, an appellation given to such medicines, whether simple or compound, as are required to be constantly kept in the apothecaries shops. See the article **MEDICINE**.

OFFICIO, or **SUSPENSION AB OFFICIO**. See the article **SUSPENSION**.

OFFIDA, a town of Italy, subject to the pope, twenty-six miles south of Loretto.

OFFING, or **OFEIN**, in the sea-language, that part of the sea a good distance from shore, where there is deep water, and no need of a pilot to conduct the ship: thus, if a ship from shore be seen sailing out to seaward, they say, she stands for the offing: and if a ship, having the shore near her, have another a good way without her, or towards the sea, they say, that ship is in the offing.

OFF-SETS, in gardening, are the young shoots, that spring from the roots of plants; which being carefully separated, and planted in a proper soil, serve to propagate the species.

OFF-SETS, in surveying, are perpendiculars let fall, and measuring from the stationary lines to the hedge, fence, or extremity of an enclosure. See the article **SURVEYING**.

OGEE, or **O. G.** in architecture, a moulding, consisting of two members, the one concave, and the other convex; or, of a round and a hollow, like an S. See **MOULDING** and **CYMATIUM**.

OGIVE, in architecture, an arch, or branch of a gothic vault; which, instead of being circular, passes diagonally from one angle to another, and forms a cross with the other arches. See the articles **ARCH**, **VAULT**, &c.

The middle, where the ogives cross each other, is called the key; being cut in form of a rose, or a cul de lampe.

The members or mouldings of the ogives are called nerves, branches, or reins; and the arches which separate the ogives, double arches.

OGLIO, a river which rises in the Alps, in the county of Trent, and, after running southward, thro' the lake Isco and dutchy of Mantua, falls into the Po, a little west of Borgoforte.

OGLIO, or **OLIO**, in cookery. See the article **OLIO**.

OHIO, a large river of north America, which, taking its rise in the mountains of Pennsylvania, runs south-west; and, after receiving many considerable branches, falls into the Mississippi.

OHNSPACH, or **ANSPACH**. See the article **ANSPACH**.

OIL, *oleum*, in natural history, an unctuous inflammable substance, drawn from several natural bodies, as animal and vegetable substances.

Animal oils are their fats, which are originally vegetable oils: all animal substances yield them, together with their volatile salts, in distillation.

Vegetable oils are obtained by expression, infusion, and distillation.

The oils by expression are obtained from the seed, leaves, fruit, and bark of plants; thus, the seed of mustard, and of the sunflower, almonds, nuts, beech mast, &c. afford a copious oil by expression; and the leaves of rosemary, mint, rue, wormwood, thyme, sage, &c. the berries of juniper, olives, indian cloves, nutmeg, mace, &c. the barks of cinnamon, saffrafras, and clove, yield a considerable proportion of essential oil by distillation.

The method of procuring oils by expression is very simple; thus, if either sweet

or bitter almonds, that are fresh, be pounded in a mortar, the oil may be forced out with a press, not heated: and in the same manner should the oil be pressed from linseed and mustard. The avoiding the use of heat in preparing these oils, intended for internal medicinal use, is of great importance, as heat gives them a very prejudicial rancidness.

This method holds of all those vegetable matters that contain a copious oil, in a loose manner, or in certain cavities or receptacles; the sides whereof being broke, or squeezed, makes them let go the oil they contain: and thus the zest or oil of lemon-peel, orange-peel, citron-peel, &c. may be readily obtained by pressure, without the use of fire. But how far this method of obtaining oils may be applied to advantage, seems not hitherto considered. It has been commonly applied to olives, almonds, linseed, rape-seed, beech-mast, ben-nuts, walnuts, bay-berries, mace, nutmeg, &c. but not that we know of to juniper-berries, cashew-nuts, indian cloves, pine-apples, and many other substances that might be enumerated, both of foreign and domestic growth. It has, however, been of late successfully applied to mustard-seed, so as to extract a curious gold-coloured oil, leaving a cake behind, fit for making the common table mustard.

Certain dry matters, as well as moist ones, may be made to afford oils by expression, by grinding them into a meal, which being suspended to receive the vapour of boiling water, will thus be moistened so as to afford an oil, in the same manner as almonds; and thus an oil may be procured from linseed, hemp-seed, lettuce-seed, white poppy-seed, &c.

As to the treatment of oils obtained by expression, they should be suffered to depurate themselves by standing in a moderately cool place, to separate from their water, and deposit their fæces; from both which they ought to be carefully freed. And if they are not thus rendered sufficiently pure, they may be washed well with fresh water, then thoroughly separated from it again, by the separating-glass, whereby they will be rendered bright and clear.

The next class of oils are those made by infusion, or decoction, wherein the virtues of some herb or flower is drawn out in the oil; as the oils of roses, chamæmile, hypericum, elder, &c. However, these require to be differently treated:

thus, for the scented flowers, particularly roses, insolation does best; because much boiling would exhale their more fragrant parts: but oils impregnated with green herbs, as those of chamæmile and elder, require long boiling, before they receive the green colour desired. And, in general, no oils will bear to be boiled any longer than there remains some aqueous humidity, without turning black.

There are many compound oils prepared in the same manner, viz. by boiling and insolation, and then straining off the oil for use.

The same contrivance has likewise its use in making essences for the service of the perfumer; not only where essential oils cannot be well obtained in sufficient quantities, but also where they are too dear. The essential oil of jessamin-flowers, honey-suckles, sweet-briar, damask-roses, lillies of the valley, &c. are either extremely dear, or scarce obtainable by distillation; and, in some of them, the odorous matter is so subtle, as almost to be lost in the operation. But if these flowers be barely infused in fine oil of nuts, or oil of ben, drawn without heat, and kept in a cool place, their subtle odorous matter will thus pass into the oil, and richly impregnate it with their flavour. And these essences may be rendered still more perfect by straining off the oil at first put on, and letting it stand again, without heat, upon fresh flowers; repeating the operation twice or thrice.

Oils, or fats, may likewise be obtained, by boiling and expression, from certain animal substances; for the membranes which contain the fat, being chopped small, and set in a pan over the fire, become fit for the canvas-bag, and, by pressure, afford a large quantity of fat; as we see in the art of chandlery, which thus extracting the oily matter, leaves a cake behind, commonly called graves. See the article CANDLE.

As to the essential oils of vegetables, they are obtained by distillation, with an alembic and a large refrigeratory. Water must be added to the materials, in sufficient quantity, to prevent their burning; and they should be macerated or digested in that water, a little time before distillation. The oil comes over with the water, and either swims on the top, or sinks to the bottom, according as it is specifically heavier or lighter than water. See DISTILLATION and GRAVITY.

This process is applicable to the distilling
of

of the essential oils from flowers, leaves, barks, roots, woods, gums, and balsams, with a slight alteration of circumstances, as by longer digestion, brisker distillation, &c. according to the tenacity and hardness of the subject, the ponderosity of the oil, &c.

Essential oils may be divided into two classes, according to their different specific gravities; some floating upon water, and others readily sinking to the bottom. Thus, the essential oils of cloves, cinnamon, and saffrafrs, readily sink; whereas those of lavender, marjoram, mint, &c. swim in water: the lightest of these essential oils, is, perhaps, that of citron-peel, which even floats in spirit of wine; and the heaviest seems to be oil of saffrafrs.

For obtaining the full quantity of the more ponderous oils from cinnamon, cloves, saffrafrs, &c. it is proper to reduce the subjects to powder; to digest this powder for some days in a warm place, with thrice its quantity of soft river-water, made very saline by the addition of sea-salt, or sharp with oil of vitriol; to use the strained decoction, or liquor left behind in the still, instead of common water, for fresh digestion; to use for the same purpose the water of the second running, after being cleared of its oil; not to distil too large a quantity of these subjects at once; to leave a considerable part of the still, or about one fourth empty; to use a brisk fire, or a strong boiling heat, at the first, but to slacken it afterwards; to have a low still-head, with a proper internal ledge and current leading to the nose of the worm; and, finally, to cohobate the water, or pour back the liquor of the second running upon the matter in the still, repeating this once or twice.

The directions here laid down for obtaining the ponderous oils to advantage, are easily transferred to the obtaining of the lighter; so that we need not dwell particularly upon them.

Many of the essential oils being dear, it is a very common practice to adulterate or debase them several ways, so as to render them cheaper both to the seller and the buyer. These several ways seem reducible to three general kinds, each of which has its proper method of detection, viz. 1. With expressed oils. 2. With alcohol. And, 3. With cheaper essential oils.

If an essential oil be adulterated with an

expressed oil, it is easy to discover the fraud; by adding a little spirit of wine to a few drops of the suspected essential oil, and shaking them together; for the spirit will dissolve all the oil that is essential, or procured by distillation, and leave all the expressed oil that was mixed with it, untouched.

If an essential oil be adulterated with alcohol, or rectified spirit of wine, it may be done in any proportion, up to that of an equal quantity, without being easily discoverable either by the smell or taste: the way to discover this fraud, is to drop a few drops of the oil into a glass of fair water: and if the oil be adulterated with spirit, the water will immediately turn milky, and, by continuing to shake the glass, the whole quantity of spirit will be absorbed by the water, and leave the oil pure at top.

Finally, if an essential oil be adulterated by a cheaper essential oil, this is commonly done very artfully: the method is to put fir-wood, turpentine, or oil of turpentine into the still, along with the herbs to be distilled for their oil, such as rosemary, lavender, origanum, &c. and, by this means, the oil of turpentine distilled from these ingredients, comes over in great quantity, and intimately blended with the oil of the genuine ingredient. The oils thus adulterated always discover themselves in time, by their own flavour being overpowered by the turpentine-smell; but the ready way to detect the fraud, is to drench a piece of rag, or paper, in the oil, and hold it before the fire; for thus the grateful flavour of the plant will fly off, and leave the naked turpentine-scent behind.

The virtues of oils being the same with those of the substances from whence they are obtained, may be learned under their several articles.

As for the oils of beech, bricks, cloves, &c. see the articles BEECH, BRICK, &c. Oil is well known to stop the violent ebullition of various substances: thus, if sugar, honey, &c. be boiling, and in danger of rising over the sides of the vessel, the pouring in a little oil, makes it immediately subside.

OIL-MILL, one that serves to bruise or break the nuts, olives, and other fruits and grains, whose juice is to be drawn by expression, to make oil; the structure of which is described under the article OLIVE.

OIL, in commerce, makes a very considerable article. Ordinary oil of olives from any

any place, not otherwise rated, pays on importation 6l. 13s. $2\frac{40}{100}$ d. the ton, and draws back on exportation 5l. 8s. more, if in a foreign bottom, 8s. Provence-oil pays, on importation, the ton, 21l. 13s. $2\frac{40}{100}$ d. and draws back on exportation 12l. 18s. Oil of hemp-seed pays on importation, the ton, 11l. 7s. and draws back on exportation 10l. 17s. 6d. Rape and linseed-oil pay, on importation, the ton, 20l. 19s. 6d. and draw back on exportation 19l. 6s. 3d. Other seed-oils, for every 20s. value, pay on importation 3s. $10\frac{20}{100}$ d. and draw back on exportation 3s. $4\frac{1}{2}$ d. and besides, for every ton 7l. 10s. on importation, and draw back 7l. 10s. on being exported. Sallad-oil pays on importation, the gallon, $11\frac{55}{100}$ d. and draws back on exportation $10\frac{12\frac{1}{2}}{100}$ d. See

vil, Majorca, Minorca, Apuglia, and Portugal-oil, pay on importation, the ton, 6l. 3s. $2\frac{40}{100}$ d. and draw back on exportation 5l. 8s. Train-oil, or blubber of whales, and whale-fins, as also the skins, oil, blubber, or other produce whatever of seals, and other creatures, taken and caught in the Greenland-seas, Davis's freights, or any other parts of the seas adjoining, were to be imported duty-free till December 25, 1757, and from thence to the end of the then next session of parliament; and the same brought from Newfoundland, or any other of his majesty's colonies, caught and imported in ships belonging to England, Wales, or Berwick upon Tweed, is also imported duty-free. Every ton of such oil, taken by shipping belonging to any of his majesty's colonies, and imported in such shipping, pays 11s. $8\frac{40}{100}$ d. and draws back on exportation 8s. $10\frac{20}{100}$ d. Every ton of such oil taken by the said shipping, but imported in ships belonging to England, Wales, or Berwick upon Tweed, pays 5s. $10\frac{20}{100}$ d. and draws back on exportation 4s. $5\frac{10}{100}$ d. If caught and imported by foreigners, it pays by the ton 15l. 16s. and draws back on exportation 11l. 10s. 6d.

-OIL of the earth, *oleum terræ*, a mineral fluid, of the consistence of a syrup in winter, but in warm weather is little thicker than oil of olives. It is of a dusky black colour, very readily inflammable, and burning with a white but not very brisk or vivid flame.

The *oleum terræ* is found in Sumatra, where it is esteemed in paralytic disorders, used externally as an embrocation.

OIL of petræ, or Rock-OIL. See the article PETROLEUM.

OIL-BEETLE, *Meloe*, in zoology. See the article MELOE.

OINTMENT, or UNGUENT, in pharmacy and surgery. See UNGUENT.

OISANS, a town of France, in the province of Dauphine, eighteen miles south-east of Grenoble.

OISTER, or OYSTER. See OYSTER.

OKEHAM, the capital of Rutlandshire, fourteen miles east of Leicester: west long. $45'$, and north lat. $52^{\circ} 40'$.

OKER, or OCHRE, in natural history. See the article OCHRE.

OLAX, in botany, a genus of the triandria-monogynia class of plants, the calyx of which consists of a single-leafed concave, short perianthium; the corolla is funnel-shaped; but the plant not being sufficiently known, the fruit is not described.

OLDELSLO, a town in the circle of lower Saxony and dutchy of Holstein, seventeen miles west of Lubec: it is subject to Denmark.

OLDENBURG, the capital of the county of the same name in Westphalia: east long. $7^{\circ} 32'$, and north lat. $53^{\circ} 35'$.

OLDENBURG is also a town of Germany, in the dutchy of Holstein, thirty-two miles north of Lubec.

OLDENDORP, a town of Germany, in the circle of Westphalia, thirty miles south-west of Hanover.

OLDENLANDIA, a genus of the tetrandria-monogynia class of plants, the flower of which consists of four oval patent petals, twice as long as the cup; and its fruit is a coreaceous globular capsule, containing two cells, with numerous very small seeds in each.

OLDENZEL, a city of the united Netherlands, in the province of Overijssel: east long. $6^{\circ} 50'$, and north lat. $52^{\circ} 30'$.

OLDESLOE, a town of Germany, in the dutchy of Holstein, fifteen miles west of Lubec.

OLD-WIFE-FISH, the name of a species of the balistes, with three spines on the back, and a forked tail. See BALISTES.

OLD-WIFE, or WRASSE. See WRASSE.

OLEA, the OLIVE-TREE, in botany. See the article OLIVE.

OLEAGINOUS, something that partakes of the nature of oil, or out of which oil may be expressed.

OLECRANUM, or OLECRANON, in anatomy,

tomy, the posterior apophysis of the ulna, serving to form the eminence of the elbow. See ULNA and ELBOW.

OLERON, an island of France, near the coast of Poictou, fourteen miles south-west of Rochelle, being about fifteen miles long, and six broad.

Sea-laws of OLERON, certain laws relating to maritime affairs, made in the time of Rich. I. when he was at the island Oleron.

These laws, being accounted the most excellent sea-laws in the world, are recorded in the black book of the admiralty.

OLERON, is also a city of Gascony in France, thirty miles south of Dax.

OLESCO, a town of Upper Volhinia, in Poland: east longitude 24° , and north latitude 50° .

OLEUM, OIL. See the article OIL.

OLFACTORY NERVES, the first pair of the head; so called from their being the immediate instruments of smelling. See the article NERVES.

OLIBANUM, FRANK-INCENSE, in pharmacy, a dry resinous substance, brought to us in detached pieces, or drops as it were, like those of mastic; but larger, and of a less pure and pellucid texture. It is of a pale yellowish-white colour, but with some mixture of a brownish cast in it. It is moderately heavy; its smell is strong, but not disagreeable; and its taste bitter, acrid, and resinous. The drops of olibanum sometimes adhere two or more together; and, when two oblong and small ones adhere to one another, fanciful writers have called such male frank-incense, from the resemblance of a man's testicles; and, when two larger and rounder pieces adhered, they likened it to a woman's breasts, and called it female frank-incense: and hence the origin of the thus testiculofum, and thus mammosum of these writers. Sometimes four or five of these granules were found adhering to the bark of the tree; this was called the cluster frankincense: and the small fragments broke off from the rest in the carriage, were preserved separately, and made another kind, under the name of manna thuris, the manna of frank-incense. How idle and ridiculous were such distinctions among people, who knew at the same time, that the drug was the same under all these accidental forms!

Olibanum is to be chosen whitish, pure, dry, and as much approaching to pellu-

idity as may be. It has been known the most universally of any drug, perhaps, in the world, and that from as early times as those of Theophrastus and Dioscorides, who describe it under the name of libanos, and Hippocrates also mentions it under that of libanoton. The Latins call it thus and tus; and the Arabians, rouder, conder, and hateth.

The earliest accounts we have of any thing, tell us that frank-incense was in use among the sacred rites and sacrifices; and it is used in many different parts of the world at this time, to the same purposes. As well, however, as the world has been at all times acquainted with the drug itself, we are not yet well acquainted with its history. The country which produces it is a much disputed point among authors: some affirm it was never found any where but in Arabia, and there only in that part called Sabæa, or, from this famous product, Arabia Thurifera: others are for bringing it from Ethiopia; and others from other places. If we are uncertain as to the place whence the olibanum is brought, we are much more as to the tree that produces it.

Olibanum is greatly commended by many against disorders of the head and breast, and against diarrhoeas and dysenteries, and profluvia of the menses, and fluor albus. Its dose is from ten grains to a drachm. It is esteemed by many a specific in pleurisies, especially when epidemic.

Externally it is used in fumigations for disorders of the head, and against catarrhs; and is an ingredient in some plasters. It is a noble balsam in consumptions, given in substance, or dissolved with the yolk of an egg, into the form of an emulsion. There is an oil made of it per deliquium, in the same manner as that of myrrh: this is done by putting the powder of it in the white of a boiled egg, in a cellar, till it runs into a liquor; this is esteemed a great cosmetic, and destroyer of pimples in the face. Dioscorides had his doubts about the internal use of olibanum in large doses; he talks of its bringing on madness, and even death; but none of the other Greek writers say any thing of its ill qualities, nor do we at present know any of them.

OLIGAEDRA, in natural history, the name of a genus of crystals, and expresses that which is composed of only a few planes. See the article CRYSTAL. The bodies of this class are crystals of the

the imperfect kind, being composed of columns affixed irregularly to some solid body at one end, and at the other terminated by a pyramid; but the column and pyramid being both pentangular, the whole consists only of ten planes, and not, as the common kind, of twelve. Of this genus there are only three known species; 1. A whitish one, with a short pyramid, found principally in Germany, and sometimes brought over to us, among parcels of common crystal. 2. A bright and colourless one, with a longer pyramid. This is found in Germany, and in some parts of England, as in the tin mines of Cornwall, and on Mendip hills. And, 3. A brown one, with a scabrous crust. This is produced only in the East Indies, and is well known by our lapidaries by its rough coat, and is esteemed the finest of all brown crystals.

OLIGARCHY, a form of government, wherein the administration of affairs is lodged in the hands of a few persons. See the article GOVERNMENT.

OLINDA, a city and port-town of Brasil: west long. 35° , and south lat. 8° .

OLIO, or **OGLIO**, in cookery, denotes a savoury dish composed of a great variety of ingredients, chiefly used by the Spaniards.

OLITE, a town of Navarre, in Spain, twenty-five miles south of Pameluna.

OLIVA, a port-town of Poland, in the province of regal Prussia, only six miles west of Dantzic.

OLIVARIA CORPORA, in anatomy, two eminences of the medulla oblongata; so called from their resembling an olive in shape.

OLIVE, *olea*, in botany, a genus of trees belonging to the diandria-monogynia class of plants, with a monopetalous flower divided into four segments at the limb; the fruit is an unilocular drupe, of a somewhat oval shape, containing an ovato-oblong rugose nut, with a kernel of the same shape.

Olives are very oily and smooth, and therefore not good for the stomach, being apt to pall and relax it too much. The oil of olives is judiciously mixed with cataplasms of a maturating nature: it is accounted heating, emollient, and vulnerary; and good against costiveness and gripes.

In order to obtain the olive-oil, the olives are first bruised in a round trough, under a mill-stone, rolling perpendicularly over them; and when sufficiently mashed, put into the mace, or trough, *m*, of an olive-

press (plate CLXXXVI. fig. 5.) where *aa* are the upright beams, or cheeks; *b*, the female, and *c*, the male-screw; *e*, the bar for turning the screw; *f*, the board on which the screw presses; *g*, a cubical piece of wood, called a block; *h*, the peel, a circular board, to be put under the block. By turning the screw, all the liquor is pressed out of the mashed olives, and is called virgin-oil; after which, hot water being poured upon the remainder in the press, a coarser oil is obtained. Olive-oil keeps only about a year, after which it degenerates.

OLIVE-COLOUR, a yellow mingled with black. See the article COLOUR.

OLIVENZA, a town of Alentejo, in Portugal, ten miles south of Elvas.

OLMUTS, a city of Moravia, seventy-five miles north of Vienna.

OLONE, a port-town of France, thirty miles north-west of Rochelle.

OLSE, a town of Silesia, ten miles north of Breslaw.

OLNSNITZ, a town of Upper Saxony, sixty miles south-west of Dresden.

OLYMPIA, a port-town of the Morea, at present called Longinico: east long. $21^{\circ} 35'$, and north lat. $37^{\circ} 40'$.

OLYMPIAD, *ολυμπιας*, in chronology, the space or period of four years, whereby the Greeks reckoned time; for the epocha or commencement of which, see the article EPOCHA.

OLYMPIC GAMES were solemn games, famous among the antient Greeks, so called from Olympian Jupiter, to whom they were dedicated; and by some said to be first instituted by Jupiter, after his victory over the sons of Titan; others ascribe their institution to Hercules, not the son of Alcmena, but one of much greater antiquity; others, to Pelops; and others, to Hercules the son of Alcmena. These games were so considerable, that the Greeks made them their epocha, distinguishing their years by the return of the olympics. See the article EPOCHA.

The care and management of these games belonged, for the most part, to the Eleans, who, on that account, enjoyed their possessions without molestation, or fear of war or violence. They appointed a certain number of judges, who were to take care, that those who offered themselves as competitors, performed their preparatory exercises; and these judges, during the solemnity, sat naked, having before them a crown of victory, formed of wild-olive, which was presented to whomsoever they ad-

adjudged it. Those who were conquerors were called olympionices, and were loaded with honours by their countrymen. At these games, women were not allowed to be present; and if any woman was found to have passed the river Alpheus, during the solemnity, she was to be thrown headlong from a rock.

OLYMPUS, the name of two mountains, the one in Bythinia, in the lesser Asia; and the other in the island of Cyprus.

OMAN, a province or kingdom in the south-east part of Arabia Felix.

OMBRE, a celebrated game at cards, borrowed from the Spaniards, and played by two, by three, or by five persons, but generally by three. When three play at this game, nine cards are dealt to each party; the whole ombre pack being only forty, because the eights, nines, and tens are thrown out of the pack. There are two sorts of counters for stakes, the greater and the lesser; the last having the same proportion to the other, as a penny to a shilling: of the greater counters each man stakes one for the game; and one of the lesser for passing, for the hand when eldest, and for every card taken in. As to the order and the value of the cards, the ace of spades, called spadillo, is always the highest trump, in whatsoever suit the trump be; the manille, or black duce, is the second; and the baslo, or ace of clubs, is always the third: the next in order is the king, the queen, the knave, the seven, the six, the five, four, and three. Of the black there are eleven trumps; of the red, twelve. The least small cards of the red are always the best, and the most of the black; except the duce and red seven, both of which are called the manilles, and are always second when the red is a trump. The red ace, when a trump, enters into the fourth place, and is called pun'o, otherwise it is only called an ace. The three principal cards are called matadores, which have this privilege, that they are not obliged to attend an inferior trump when it leads; but, for want of a small trump, the person may renounce trumps, and play any other card; and when these are all in the same hand, the others pay three of the greater counters a-piece; and with these three for a foundation, he may count as many matadores as he has cards in an uninterrupted series of trumps; for all which the others are to pay one counter a-piece. He who hath the first hand is called ombre, and has his choice of

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playing the game, of naming the trump, and of taking in as many and as few cards as he pleases; and after him the second, &c. But if he does not name the trump before he look on the cards he has taken in, any other may prevent him, by naming what trump he pleases. He that has the first hand, should neither take in, nor play, unless he has at least three sure tricks in his hand; for, as he wins the game, who wins most tricks, he that can win five of the nine, has a sure game: which is also the case if he wins four, and can so divide the tricks as that one person may win two, and the other three.

If a person plays without discarding or changing any cards, this is called playing sans prendre; and if another wins more tricks than he, he is said to win coudille. The over-sights in the course of the game, are called beasts. And if the ombre wins all the nine tricks, it is called winning the vole.

In ombre by five, which many, on account of its not requiring so close an attention, prefer to that by three, only eight cards a-piece are dealt; and five tricks must be won, otherwise the ombre is beasted. Here, the person who undertakes the game, after naming the trump, calls a king to his assistance; upon which the person in whose hand the king is, without discovering himself, is to assist him as a partner, and to share his fate. If, between both, they can make five tricks, the ombre wins two counters, and the auxiliary king only one; but when the counters are even, they divide them equally. If the ombre venture the game without calling in any king, this too is called playing sans prendre; in which case the other four are all against him, and he must win five tricks alone, or be beasted. The rest is much the same as by three.

OMBRE DE SOLEIL, SHADOW OF THE SUN, in heraldry, is when the sun is borne in armory, so as that the eyes, nose, and mouth, which at other times are represented, do not appear; and the colouring is thin, so that the field can appear through it.

OMBRIA, the antient name of a province of Italy, in the territory of the pope, now called Soanetto and Perugia.

OMBRO, or LOMBRO, a town of Italy, in the duchy of Tuscany, and territory of the Siennois, situated near the Tuscan sea, a little south of the lake of Castiglione, forty-five miles south-west of Sienna.

OMELET, or **AMLET**, a kind of pancake or fricassée of eggs, with other ingredients, very usual in Spain and France. It may be made as follows: the eggs being beaten, are to be seasoned with salt and pepper, and then fried in butter, made boiling hot; this done, gravy is to be poured on, and the whole stewed with chives and parsley, shred small: when one side is fried enough, it is to be turned on the other.

OMEN, a certain accident and casual occurrence, that was thought to presage either good or evil. There were three sorts of omens among the ancients; one was of things internal, or those which affected the persons themselves; the second, of things external, that only appeared to men, but did not make any impression on them; the third were ominous words. Of the first sort were those sudden consternations, called panic fears, that seized upon men without any visible cause, and were therefore imputed to the dæmons, especially the god Pan: of these panics there is frequent mention in history. The second sort of omens were of such things as appeared to men, but were not contained in their own bodies: of these there were several sorts; the beginning of things were thought to contain something ominous; it was thought a direful omen, when any thing unusual befel the temples, altars, or statues of the gods; under the head of external omens are to be placed those which offered themselves in the way; such were the meeting of an eunuch, a black, a bitch with whelps, a snake lying in the road, &c. Words were ominous, and as they were good or bad, were believed to presage accordingly.

OMENTUM, or **EPIPLOON**, the **COWL**, in anatomy, a membranaceous part, usually furnished with a large quantity of fat; being placed under the peritonæum, and immediately above the intestines. See the article **INTESTINES**.

It is called by some *rete*, and *reticulum*, from the number of holes appearing in it, when raised, and giving it the resemblance of a net.

As to its situation, it usually occupies only the upper part of the abdomen; though it is sometimes found extended to the lower part: its weight in a person not remarkably fat or lean, is about half a pound: its lower part is evidently loose and free; but in its upper part it is joined, anteriorly, to the bottom of the stomach, the duodenum, and

the spleen; and posteriorly to the colon and pancreas.

It is composed of a very tender double membrane, forming a kind of pouch or cavity, called its *bursa*, and replete with fat, lodged in certain cellules, forming a kind of ducts, with certain areolæ, or membranaceous spaces between them. Its arteries come from the *cœliac*, and are very numerous; its veins arise chiefly from the splenic branch of the *vena portæ*; and its nerves are from the intercostals and the *par vagum*. See the articles **ARTERY**, **VEIN**, &c.

It has a very remarkable aperture, by which it may be conveniently distended by inflation; and there are generally some small holes in it, though the large ones, from which it got the name *rete*, are adventitious.

The uses of the omentum are, 1. By its lubricity, to render the natural and necessary motions of the intestines easy. 2. To cherish and defend the intestines from cold. 3. To assist in the formation of the bile, the fatty part of which is wholly owing to the vessels of the omentum; every thing that returns from this part going to the liver. 4. To temperate the acrimony of the humours. And, probably, 5. To serve, as all the other fat of the body, to give it nourishment, when it is incapable of being nourished any other way.

Falling down of the OMENTUM. On large wounds of the abdomen, the omentum will frequently protrude itself through the wound, either alone, or with some portion of the intestines. When this is the case, the first business is to enquire whether the protruded part preserves its heat, moisture, and natural colour: if it is not found faulty in any of these circumstances, it must be gently returned; but when the straitness of the wound forbids this, the protruded part must be taken off close to the wound, and the wound healed according to the common form. The omentum in this case will adhere to the internal part of the wound, without bringing on any disorder, or inconvenience to the patient. But where the intestines fall out at the same time, the omentum is to be fomented, by an assistant, with warm milk and water, till the intestines are returned. See the article **INTESTINES**.

If any part of the protruded omentum be cold, dry, livid, putrid, or corrupted, the mortified part must be entirely cut

cut off before the rest is returned, lest the neighbouring parts should be brought into consent, which would inevitably prove fatal to the patient. Heister directs that the corrupted part be taken off in this manner: pass a waxed thread two or three times round the sound part of the omentum, near the place where it is injured, and fasten it with a knot, to prevent any hæmorrhage from ensuing after the reduction of it; when you have made a secure ligature, take off the corrupted part with the knife, or scissars, and return what is sound, leaving, at least, the length of a foot of the ligature hanging out of the wound of the abdomen, till it slips off from the sound part of the omentum. The wound must be dressed in the common way, the depending part of it being kept open by a large tent: and, at every dressing, the ligature must be pulled a little gently forward, till it has, at length, entirely slipped off from the sound part of the omentum.

OMERS, or ST. OMERS, a city of Artois, in the french Netherlands, twenty miles south of Dunkirk, and eighteen south east of Calais.

OMITTAS, or NON OMITTAS. See the article NON OMITTAS.

OMLANDS, a division of the province of Groningen, in the United Provinces.

OMMEN, a town of the United Netherlands, in the province of Overijssel, situated on the lesser Vecht, seventeen miles north-east of Deventer.

OMMENBURG, or AMELBURG, a town of Germany, in the landgravate of Hesse, situated five miles east of Marpurg.

OMOPHAGIA, an antient greek festival, in honour of Bacchus, surnamed Orophagos, *i. e.* eater of raw flesh. This festival was observed in the same manner with the other festivals of Bacchus, in which they counterfeited madness; what was peculiar to it, was that the worshipers used to eat the entrails of goats, raw and bloody, in imitation of the god, who was supposed to do the same thing.

OMOPHORUM, in church-history, a little cloak, antiently wore by the bishops, over their shoulders.

OMOPLATE, in anatomy, is used in general for the shoulder, but more particularly for the two bones situate on the hinder part of the upper ribs, one on each side, called also scapulæ and shoulder-blades. See the article SCAPULA.

These bones are broad, and especially in

the middle; thick in their apophyses, of a triangular form, concave within, and convex without, and are joined to the clavicles.

OMPHACIUM, in pharmacy, the juice of unripe grapes: also a name given by some to a kind of oil, pretended to be drawn from olives while green and sour: but others charge it as an imposture, and affirm that olives yield no oil at all till perfectly ripe.

OMPHALOCLE, in surgery, the same with exomphalus. See EXOMPHALUS.

OMPHALO-MESENTERIC, in anatomy. All fœtuses are wrapped up in at least two coats or membranes; most of them have a third, called allantoides, or urinary. See ALLANTOIS and FOETUS. Some, as the dog, cat, hare, &c. have a fourth, which has two blood-vessels, *viz.* a vein and an artery, called omphalo-mesenterics, because passing along the string to the navel, and terminating in the mesentery.

ONANDAGOES, one of the tribes of the Iroquois, or Five Nations, situated on the lake Ontario, or Frontenac, in North America: they are Allies of Great Britain.

ONANIA, or ONANISM, terms which some late empirics have framed, to denote the crime of self-pollution, mentioned in scripture to have been practised by Onan, and punished in him with death. See the article POLLUTION.

ONEGA-LAKE, a lake upwards of an hundred miles long, and forty broad, situated in the empire of Russia, between 61° and 63° of north lat. and 35° east longitude.

ONEGLIA, a port-town of Italy, seventy miles south-west of Genoa, subject to the king of Sardinia: east long. 8° 30', and north lat. 44°.

ONEIROCRITICA, *ονειροκριτική*, the art of interpreting dreams, or predicting future events from dreams. See the article DIVINATION.

Oneirocritics have established three kinds of dreams, from which events may be predicted: 1. When the gods, or spirits, were supposed to converse with men in their sleep, and reveal to them future events. 2. When the images of the things themselves were represented in vision. 3. When future events were revealed by types and figures. Of the first kind was Agamemnon's dream, in the second Iliad, where the shape of Nestor, advised him to give the Trojans battle,

promising him success and victory. Of the second sort was that of Alexander, who dreamed that he was to be murdered by Cassander. And of the last species was that of Hecuba, who dreamed she had conceived a firebrand.

ONERANDO PRO RATA PORTIONIS, in law, a writ issued in behalf of a joint-tenant, or tenant in common, who is distrained for more rent than his proportion of the land does come to.

ONGAR, a market-town of Essex, ten miles west of Chelmsford.

ONGLE'E, in heraldry, an appellation given to the talons or claws of beasts or birds, when borne of a different colour from that of the body of the animal.

O. NI. a latin contraction used in the exchequer, by the sheriff, when he makes up his accounts for issues, amercements and mean profits; at which time he marks upon each head **O. NI.** thereby to denote, *Oneretur, nisi habeat sufficientem exonerationem*; that is, let him be charged, unless he have a sufficient discharge: whereupon he becomes the king's debtor, and a debt or debt is set upon his head; in which case the other parties are debtors to the sheriff.

ONION, *cepa*, in botany, &c. See **CEPA**.

ONISCUS, in zoology, a genus of insects, which have limbs, but no wings, and which have oblong bodies and numerous legs, or more than six pairs. The characters of the oniscus are, that the body is short and broad, and approaching to an oval figure; the legs are seven or eight on each side; the more usual number is seven. This genus comprehends the several sorts of wood lice, and the millepes.

ONKOTOMY, in surgery, the operation of opening a tumour, or abscess. See the articles **TUMOUR** and **ABSCESS**.

ONOCLEA, in botany, a genus of the cryptogamia filices class; the fruit consists of several globular capsules, with five valves and one cell, in which are several, long, small, hairy seeds.

ONOCROTALUS, in ornithology, a bird commonly called the pelican. See the article **PELICAN**.

ONOMANCY, or rather **ONOMAMANCY**, *ονομαμαντια*, a branch of divination, which foretels the good or bad fortune of a man, from the letters in his name. See the article **DIVINATION**.

From much the same principle the young Romans toasted their mistresses as often

as there were letters in their names: hence Martial says,

Naevia sex cyathis, septem Justina bibatur.

ONOMATOPOEIA, in grammar and rhetoric, a figure where words are formed to resemble the sound made by the things signified; as the buz of bees, the cackling of hens, &c.

ONONIS, or **ANONIS**, **REST-HARROW**, in botany, a genus of the diadelphia decandria class of plants, the calyx of which is a perianthium cut into five segments, and almost of the length of the corolla, which is of the butterfly kind; the fruit is a turgid, hairy pod, with two valves, and one cell, in which are a few kidney-shaped seeds. See the article **ANONIS**, and plate XVIII. fig. 5.

The root and leaves of this plant are accounted attenuant and discutient, being chiefly prescribed in the jaundice and obstructions of the viscera, the piles, &c.

ONOPORDUM, the **COTTON-THISTLE**, a genus of the syngenesia-polygamia-aqualis class of plants, the compound flower of which is tubulose; and the proper ones monopetalous and funnel-fashioned; the seeds are single, crowned with down, and contained in the bottom of the cup.

ONOS, in ichthyology, the **HADDOCK**. See the article **HADDOCK**.

ONOTH, a town of Hungary, fifty miles north-east of Buda, subject to the house of Austria.

ONRUST, a small island at the mouth of the harbour of Batavia in the East-Indies.

ONSPACH, or **ANSPACH**. See the article **ANSPACH**.

ONTARIO, or **FRONTENAC**, a lake of North-America: situated in west long. 79°, and between 41° and 43° north lat.

ONTOLOGY, or **ONTOSOPHY**, the science or doctrine of being, in the general or abstract; coinciding with what is otherwise called metaphysics. See the article **METAPHYSICS**.

ONYCOMANCY, a species of divination by means of the nails of the fingers. See the article **DIVINATION**.

ONYX, in natural history, one of the semipellucid gems, with variously coloured zones, but none red; being composed of crystal, debased by a small admixture of earth; and made up either of a number of flat plates, or of a series of coats surrounding a central nucleus, and separated from each other by veins of a dif-

different colour, resembling zones or belts.

We have four species of this gem. 1. A bluish-white one, with broad white zones. 2. A very pure onyx, with snow-white veins. 3. The jasponyx, or horney-onyx, with green zones. 4. The brown onyx, with bluish-white zones.

The ancients attributed wonderful properties to the onyx; and imagined that if worn on the finger it acted as a cardiac: they have also recommended it as an astringent, but at present no regard is paid to it.

OOST, a kiln for drying hops after they are picked from the stalks.

This is a square room built up of brick or stone, ten feet wide, more or less, and with a door on one side: in the midst of this room is a fire-place, about thirteen inches wide, and as much high; and in length reaching so nearly to the back of the kiln, that a man has just room to go round it. This fire-place is called a herse, and the fire is let out into the room by several holes in the sides. Five feet above this, is laid the floor on which the hops are to be laid to dry, and this must have a wall round it of four feet high, to keep the hops from falling out: at one side of the upper bed must be made a window to put out the hops as they are dried, into a room prepared for them: the beds may be made of laths an inch square, placed at a quarter of an inch distance from one another, and supported by beams underneath; or it may be made of the same laths placed lattice-wise, and covered with large plates of double tin, taking care that the tin plates be well soldered; or instead of these plates, the new invented tiles filled with holes may be used: the hops are to be poured on this bed till it is covered about a foot thick with them, and they being spread even with a rake, the fire is to be lighted in the fire-place below: some recommend a wood fire, but experience shews that nothing does so well as charcoal; the fire must not be too fierce at first, and must not sink or slacken, but rather increase, till the hops are near dried, lest the moisture or sweat which the fire has raised, fall back and discolour them: if the floor is covered with tin plates, or the new invented tiles, the hops may be stirred about while drying, which will prevent those being scorched which would otherwise lie at the bottom. See the article **HOP**.

OOSTERGO, the north division of West-Friesland, one of the United Provinces.

OOZY Ground, a name given by the seamen to soft, slimy or muddy ground.

OPACITY, in philosophy, a quality of bodies which renders them impervious to the rays of light. See **LIGHT**.

The opacity and transparency of bodies in general are occasioned thus: let A B (plate, CLXXXVIII. fig. 2. n^o 1.) be the surface of an opaque body A B C D, a ray of light G H falling thereon in the point H, will in part be reflected into the ray H I, and by this reflected ray, the point H becomes visible to the eye at I; and thus all the points, and consequently the whole surface, is made visible by that part of the light which it reflects. But the other part of the ray, entering into the body, being irregularly refracted and reflected through its internal substance of particles and pores, becomes divided, dissipated, absorbed and lost therein; and therefore, as none of the rays can come from the internal parts to the eye, so none of those parts can be visible; and the body in that case is said to be opaque. In order to this we must consider, that though the whole body be opaque, yet the particles of such a body are not singly opaque, but freely transmit the light without reflecting any part between the surfaces, and are therefore in themselves transparent; and were these particles contiguous to each other, the light would pass from one to another, and so through the whole, without reflection; as we find by experiment it will pass through several contiguous pieces of polished glass, and thus produce transparency. But if the particles do not touch in such a manner as to leave the interstices or pores exceeding small, there will be a reflection of light at every pore from the air which it there meets with, as being a medium of different density. For it is known by experiment, that though a ray of light will pass from one piece of glass to another that is contiguous, without reflection, yet will it not pass from the glass through the contiguous air without being in part reflected; consequently, where the pores are large and very numerous, there the reflection of light will be so great upon the whole as to cause a total dissipation and loss of the light that enters the body, and so render it opaque. This is confirmed by taking ten pieces of clear glass, and laying them one upon another over a leaf of print quite dry, and having

only air between them ; then taking ten other pieces of the same glass, and putting them into water, so that it may fill all their interstices ; and then laying them on the same printed paper by the other, a person looking through each, will see the print, or reading, much more distinct, clear and bright through the latter pieces than through the former, the rays being more regularly transmitted through them where the density of the parts is not so unequal, and also with much less reflection than through the other, where the light undergoes a considerable reflection at every interstice or plate of air between the glasses.

It is hence also that transparent bodies are rendered opake by separating their parts, and rendering them more porous : thus beer, before it is raised into froth, is transparent ; but the froth, by reason of its pores, becomes opake : thus dry paper is more opake than that which is wetted with water or oil, because more porous : thus the oculus mundi stone is more opake when dry than when steeped in water ; and glass, reduced to powder, is no longer transparent. Hence it follows, that the parts of bodies, and their pores, must not be less than a certain definite bigness to render them opake ; for the opakest bodies, if their parts be subtilely divided, becomes perfectly transparent : thus copper, dissolved in aquafortis, has all its particles pellucid ; and the whole solution is transparent : thus a bubble blown off soap water, may become so thin on the top as to reflect no light, but will transmit the whole : thus water, salts, glass, stones, &c. though they are as porous as other bodies, yet their parts and interstices are too small to cause reflections in their common surfaces.

Therefore, in all transparent bodies, as *B E F C*, (*ibid.* n° 2.) a ray of light, *K L*, falling on its surface, in the point *L*, will there be in that part reflected, as before into the ray *L M* ; the other part will go regularly, or in a rectilineal direction from the upper to the lower surface at *N*, where meeting with the air, (a medium of a different density) it will be in part reflected again into the ray *N O* ; the other part goes out to the eye at *P* ; by which means, all the internal parts from whence that ray comes, will be rendered visible to the eye ; and since this may be conceived of every point in the body, it is easy to understand how

the whole becomes transparent. See *REFLECTION* and *REFRACTION*.

OPAL, in natural history, a species of the chroastaces genus of gems. See the article *CHROASTACES*.

The opal is a gem of a very peculiar kind, and has been esteemed by many in all ages of very great value, though at present it is of less value, in proportion to its size, than any of the finer gems. It is softer than any other of the fine gems, and is difficult to polish to any degree of nicety. It is found of various shapes and sizes ; its most frequent bigness is between that of a pea and a horse-bean, but it is found as small as the head of a large pin, and has been seen of the size of a large walnut. Its figure is very various and uncertain, but it is never found in a crystalliform or columnar state ; its most usual shape is an irregularly oblong one, convex above, flatted at bottom, and dented with various sinuities at its sides. It is often found among the loose earth of mountains, sometimes on the shores of rivers, and not unfrequently bedded in the coarser kinds of jasper. It is found in Egypt, Arabia, some parts of the East-Indies, and in many parts of Europe : those of Europe, are principally from Bohemia, and are of a greenish or greyish colour ; the colour of other opals much resembles the finest mother of pearl, its basis seeming a bluish or greyish white, but with a property of reflecting all the colours of the rainbow, as turned differently to the light.

OPALIA, in antiquity, feasts celebrated at Rome in honour of the goddess *Ops*. Varro says they were held on the nineteenth of December, which was one of the days of the saturnalia : these two feasts were celebrated in the same month, because Saturn and *Ops* were husband and wife : the vows offered to the goddess were made sitting on the ground.

OPEN flank, in fortification. that part of the flank which is covered by the orillon. See the article *FLANK*.

OPENING of trenches, is the first breaking of ground by the besiegers, in order to carry on their approaches towards a place. See the article *TRENCHES*.

OPENING of gates, in astrology, is when one planet separates from another, and presently applies to a third ; bearing rule in a sign opposite to that ruled by the planet, with which it was before joined.

OPERA,

OPERA, a dramatic composition set to music, and sung on the stage, accompanied with musical instruments, and enriched with magnificent dresses, machines, and other decorations. Bruyere says, that it is essential to the opera to keep the mind, the eyes, and ears, in an enchantment. We derive the opera from the Venetians, among whom it is held one of the principal glories of the carnival. From the first rise of the Italian theatre, music has always been intermixed with action. The method of introducing it into the drama, has varied according to the several junctures. At first it began by the chorus always being sung; then the prologues, interludes in verse, and epilogue. When the theatre, by the final productions of a more polished age, began to improve, the practice of intermixing music with the representation of true tragedies or comedies, wore out in twenty or thirty years, and both were represented in the taste and simplicity of the ancients. By this sudden change we may easily conceive that the use of music was quite laid aside, because inconsistent with these regular representations. Sometime after, the poets abandoned that severity for which they had been so remarkable at the beginning of their reformation; nor does any Italian writer inform us of the reasons. After that tragedies were represented without a chorus, music was again admitted into the prologue of comedies, and, by degrees, they introduced interludes which had no relation to the main subject; sometimes those interludes were unconnected one with another, and each made an action apart; but very often, three or four interludes formed a continued action, which was a great embellishment to the principal piece.

Formerly the opera comprehended all subjects; but since the machinery has been laid aside, it deals no longer in fables, divinities, music, pastoral, and the like, but confines itself entirely to history. The old operas that have come to our hands, are proofs of the Italian genius in treating historical subjects: but at present a barrenness of imagination seems to have succeeded this fertility, the French tragedies being commonly pillaged to furnish out their plans, their scenes, and even their thoughts.

OPERATION, in general, the act of exerting or exercising some power or faculty, upon which an effect follows.

The noblest operation in men is that by the schoolmen, called vital or immanent, *viz.* the operations of the mind; which, with regard to the understanding, is threefold; apprehension or perception, discretion or judgment, and reasoning or discourse; the direction of which makes the object of logic. See the article **PERCEPTION**, &c.

With regard to the will, the immanent operations are willing and nilling, to which are referred loving and hating. From the will also proceed sensitive and locomotive operations, as seeing, speaking, walking, &c.

OPERATION, in chirurgery and medicine, denotes a methodical action of the hand on the human body, in order to re-establish health. Chirurgical operations are performed differently and on various parts of the body, as blood-letting, and other operations of the like nature; operations on the head, on the eyes, the nose, the mouth, the neck, the breast, the abdomen, and the parts of generation; also operations of lithotomy, under which are included the high operation, the lateral operation, and the low operation: other operations are those in the art of midwifery, operations on the anus, on the extreme parts, &c. each of which are described under their several heads, and referred to from the several subjects. See **PHLEBOTOMY**, **COUCHING**, **LITHOTOMY**; as also, **HEAD**, **NOSE**, &c. The best authors on chirurgical operations in general, are Celsus, Aegineta, Paræus, Fabr. ab Aquapendente, Solingens, Nuchius, Verduc, Vanguion, Chauvriere, Dionis, Pasynus, Masierus, Garangeot, Marinus, Heister, Sharp, &c. Operation is more particularly used in medicine, for the manner wherein any remedy produces its salutary effect; of that series of actions, mediate or immediate, whereby its remote end is attained.

The several operations of each kind of medicines may be seen under their several heads. See **EMETIC**, **DIURETICS**, **EMOLLIENTS**, **ERRHINES**, &c.

OPERATIONS, in chemistry, denote the processes or experiments whereby bodies are changed agreeably to the rules of the art, and to the end proposed therein. All chemical operations require a certain or determinate heat or degree of fire, in order to perform them with the greatest advantages; and this heat must be assigned and obtained in every case, to the

the great improvement of chymistry. See the articles **HEAT** and **FIRE**.

The changes chymistry produces in bodies, are reducible to two kinds, *viz.* an union of parts and a separation thereof: thus chymistry either separates spirits, salts, oils, &c. or compounds them together. A chemical operation then consists in changing the situation of the parts, particularly either in moving some parts, but not the whole, which is called separating; or in adding new parts, which is called uniting. All chemical operations, therefore, are reducible to two general kinds, *viz.* such whereby the parts of bodies before joined or united are separated, which the antient chemists called solution; or such whereby the parts before disjoined are combined or united, called coagulation. Some, however, object digestion as a third species of operation, but Boerhaave shews that it is a composition of both. Most chemists, however, look upon this division as scarcely accurate and minute enough, and subdivide the art into a number of particular and subordinate operations, as calcination, vitrification, distillation, sublimation, cohobation, amalgamation, fermentation, putrefaction, &c. See the articles **CALCINATION**, **VITRIFICATION**, &c.

Dr. Shaw observes that the different success of chemical operations, may be greatly owing to the particular vapours or effluvia floating in the laboratory where such operations are performed: thus if salt of tartar be run per deliquium where vinegar is distilling, it becomes regenerated tartar, a thing very different from that intended. See **LABORATORY**.

OPERATOR, a person who performs an operation: thus an operator in surgery and medicine, is one who operates or works with the hand on the human body, to preserve or restore its health; hence a lithotomist is called an operator for the stone; a person who cures cataracts, &c. an operator for the eyes; and one who draws teeth, &c. an operator for the teeth.

OPHIDION, in ichthyology, a genus of the acanthopterygious class of fishes, the body of which is long, subcylindric, and has three fins; the branchiostegemembrane contains seven bones, they are oblong, slender, and somewhat crooked, and are with great difficulty distinguished, unless the fish have the skin first taken off. Of this genus there are two species, *viz.*

the ophidion with four beards on the lower jaw, growing to the size of a large eel; and the ophidion without beards, growing to about a foot and a half long. **OPHIDION**, is also the name whereby some authors call that species of the syngnathus, commonly termed the sea-adder.

OPHIOGLOSSUM, in botany, the plant adder's tongue. See the article **ADDER'S tongue**.

OPHIOMANCY, *ὀφιδίμαντεια*, in antiquity, the art of making predictions from serpents. Thus Calchas, on seeing a serpent devour eight sparrows with their dam, foretold the duration of the siege of Troy. And the seven coils of a serpent that was seen on Anchises's tomb, were interpreted to mean the seven years that Æneas wandered from place to place before he arrived in Latium. Thus, Virgil, *Æn.* l. 5. v. 85.

Septem enim gyros, septena volumina traxit.

OPHIORHIZA, in botany, a genus of the pentandria-monogynia class of plants, the calyx of which is a single leaved, permanent perianthium, cut into five segments; the corolla consists of a single funnel-fashioned petal; the fruit is a broad, obtuse, bilobated capsule, containing a great many angular seeds.

OPHIOXYLON, in botany, a genus of the polygamia-monoecia class of plants, the calyx of which is a very small perianthium, cut into five segments; the corolla consists of a single funnel-shaped petal, the fruit of the hermaphrodite is a didymous bilocular berry, in which is a single roundish seed.

OPHITES, in natural history, a sort of variegated marble, of a dusky-green ground, sprinkled with spots of a lighter green, otherwise called serpentine. See the article **MARBLE**.

OPHITES, in church history, christian heretics, so called both from the veneration they had for the serpent that tempted Eve, and the worship they paid to a real serpent: they pretended that the serpent was Jesus Christ, and that he taught men the knowledge of good and evil: they distinguished between Jesus and Christ; Jesus, they said, was born of the virgin, but Christ came down from heaven to be united with him: Jesus was crucified, but Christ had left him to return to heaven. They distinguished the God of the Jews, whom they termed Jaldabaoth, from the supreme God: to the former they ascribed the body, to the latter the soul

foul of men. They had a live-serpent which they kept in a kind of cage; at certain times they opened the cage door and called the serpent: the animal came out, and mounting upon the table, twined itself about some loaves of bread; this bread they broke and distributed it to the company, who all kissed the serpent: this they called their Eucharist.

OPHRIS, or OPHRYS, TWYBLADE, in botany, a genus of the gynandria-dian-dria class of plants, the flower of which consists of five oblong petals; and the fruit is an oval capsule, containing a multitude of dust-like seeds.

OPHTHALMIA, *οφθαλμία*, in medicine, an inflammation of the membranes which invest the eye; especially of the adnata, or albugineous coat. See EYE. The eyes are very much inflamed with great pain, tension, tumour, heat, and redness; and sometimes there is such a strong sensation of pricking in the eye, as if it was caused by a needle or thorn. The eyes at first are full of scalding tears, which are followed by a pituitous matter, sometimes small in quantity, and sometimes more plentiful: a sordes adheres to the greater angle of the eye; and when the disease is violent, the neighbouring parts will swell, even as far as the cheeks, with a strong pulsation of the adjacent arteries. The small blood-vessels are visible, which in health are not to be seen, and all the white of the eye becomes red. If, besides these external signs, there is an appearance of moths, dust, flies, &c. floating in the air, there is an inflammation of the retina, which Dr. Pitcairn calls the internal ophthalmia. See the article *Diseases of the EYE*.

As in all the diseases of the eyes, so especially in their inflammation, Hoffman directs the patient to abstain from all spirituous liquors, the smoke of tobacco, and sternutatories: he must likewise avoid smoky rooms, the vapours of onions and garlic, as also all vivid lights and glaring colours. The drink may be water alone, or a decoction of fennel-seeds, harts-horn and barley; the aliment must be light of digestion. Intemperance of all kinds renders persons liable to this disease; as also a keen north-wind, and looking earnestly at the fire, sun, or glaring colours; likewise metallic vapours, costiveness, and unusual refrigerations of the extreme parts, especially in menstruation. Sometimes it is ow-

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ing to other diseases, as the small-pox, measles, scurvy, and the driving back the gouty matter.

A slight ophthalmia is easily cured; a more severe one generally continues a month or longer, and often leaves a spot in the cornea, or depraves the humours of the eye.

Sydenham directs the patient to take away ten ounces of blood, and the next morning to give the common purging potion, which may be repeated twice more, with the interposition of two days between every dose; and at night an ounce of diacodium. On the days in which purging is omitted, let the patient take four ounces, three or four times in a day, of the emulsion of the four greater cold seeds, and white poppy seeds: externally, take plantane-water, red roses, and frog-spawn, of each one ounce, and prepared powder of tutty one dram; make a collyrium, and let a few drops be dropped in the eyes twice in a day, but not till after the first purge.

If the disease does not yield to repeated cathartics and bleeding, give an ounce of diacodium every night. In a strumous ophthalmia, calomel is the only remedy, according to Pitcairn. In the mean while he recommends the application of blisters to the neck, and after that setons, or issues at least. Hoffman, besides blisters, setons, &c. recommends cupping, with scarification in the nape of the neck and behind the ears; and in the violent sort of this disease, bleeding in the jugular; as also sinapisms of rocket-seeds boiled in wine, and then put into small bags, and applied to the nape of the neck or to the arm-pits: for inward use he recommends an infusion, in the manner of tea, of valerian-root, liquorice, elder flowers, and fennel-seed, drank plentifully; and before the drinking of it to receive the vapour or steam into the eyes: externally, Shaw recommends a dram of camphor to be dissolved in an ounce of french brandy, used as a collyrium. Junker says, if this composition makes the eye smart too much, blowing therein will soon take off the brandy, and leave all the camphor behind: but when there is a corroding acrimony, Hoffman recommends the mucilage of quince-seeds, with rose-water, with a very little saffron, to which if it is necessary a little opium may be added: and every evening temperate pediluvia may be used. In a chronic ophthalmia,

ophthalmia, where there is a continual dripping of a salt, sharp lymph, mix a scruple of white vitriol with two drams of unsalted butter, of which put as much as the size of a pea into the greater angle of the eye, repeating it now and then. Dr. Cheyne says Æthiop's mineral, taken in a large dose, twice a day, and continued a long time, never fails curing an inveterate ophthalmia.

OPHTHALMICS, medicines good in disorders of the eyes. See EYE.

OPHTHALMIC NERVES, the fifth pair of the head. See the article NERVES.

OPHTHALMOGRAPHIA, the description of the eye. See the article EYE.

OPHTHALMOSCOPY, a branch of physiognomy, which deduces the knowledge of a man's temper and manners from the appearance of his eyes.

OPIATES, medicines of a thicker consistence than a syrup, prepared with opium scarcely fluid. They consist of various ingredients, made up with honey or syrup; and are to be used for a long time either for purgative, alterative or corroborative intentions. Hence there are opiates of three kinds; that is, of a purgative, an alterative, and of a corroborating quality.

The word opiate is also used, in general, for any medicine given with an intention to procure sleep, whether in the form of electuaries, drops, or pills, of which kind is Matthew's pill; the best method of preparing which, according to Dr. James, is as follows: take of the extract of opium, of black hellebore, of liquorice, and the soap of tartar, each four ounces; let the hellebore and liquorice be made into a subtile powder; beat and mix these ingredients well together; then with two or three ounces of this mass, mix an ounce of english saffron cut into small pieces, and beat them together till the saffron is so perfectly mixed that no part of it is discernible from the rest; then beat and mix that with the rest of the mass. If this mass be too dry, mix it with as much rectified oil of turpentine as is sufficient to make it into a mass fit to form into pills. Then put it into a gally-pot, over which tie a bladder or piece of leather, and set it by for use. For the effects of opiates, see the article OPIUM.

OPINION, is defined to be an assent of the mind to propositions not evidently true at first sight.

Probable arguments beget opinion, as

demonstration does science. See PROBABILITY and DEMONSTRATION.

OPISTHOTONOS, in medicine, a kind of convulsion, wherein the body is bent backwards. See CONVULSION.

OPIUM, in the materia medica, is an inspissated juice, partly of the resinous, and partly of the gummy kind, brought to us in cakes from eight ounces to a pound weight. It is very heavy, of a dense texture, and not perfectly dry; but, in general, easily receives an impression from the finger: its colour is a brownish yellow, so very dark and dusky that at first sight it appears black: it has a dead and faint smell, and its taste is very bitter and acrid. It is to be chosen moderately firm, and not too soft; its smell and taste should be very strong, and care is to be taken that there is no dirty or stony matter in it.

Opium is the juice of the papaver album, or white poppy, with which the fields of Asia Minor are in many places sown, as ours are with corn. When the heads are near ripening, they wound them with an instrument that has five edges, which on being stuck into the head makes at once five long cuts in it; and from these wounds the opium flows, and is next day taken off by a person who goes round the field, and put up in a vessel which he carries fastened to his girdle: at the same time that this opium is collected, the opposite side of the poppy head is wounded, and the opium collected from it the next day. They distinguish, however, the produce of the first wounds from that of the succeeding ones, for the first juice afforded by the plant is greatly superior to what is obtained afterwards. After they have collected the opium, they moisten it with a small quantity of water or honey, and work it a long time upon a flat, hard, and smooth board, with a thick and strong instrument of the same wood, till it becomes of the consistence of pitch; and then work it up with their hands, and form it into cakes or rolls for sale.

Opium, on importation, pays a duty of 1s. 11¼d. the lb. and draws back, on exportation, 1s. 8¼d.

Opium at present is in great esteem, and is one of the most valuable of all the simple medicines: applied externally it is emollient, relaxing and discutient, and greatly promotes suppuration; if long kept upon the skin it takes off the hair, and always occasions an itching in it; sometimes

sometimes it exulcerates it, and raises little blisters if applied to a tender part. Laid on the perinæum it promotes venereal inclinations; and sometimes on external application, it allays pain, and even occasions sleep: but it must by no means be applied to the head, especially to the sutures of the skull, for it has been known to have the most terrible effects in this application, and even to bring on death itself. Opium, taken internally, removes melancholy, eases pain, and disposes to sleep; in many cases removes hæmorrhages, provokes sweating, and is a provocation to venery; and in general has a greater effect on women and children than on men. A moderate dose is commonly under a grain, though according to the circumstances two grains, or even three may be within the limits of this denomination; but custom will make people bear a dram or more, tho' in this case nature is vitiated, and nothing is to be hence judged in regard to others. If given dissolved, it operates in half an hour; if in a solid form, as in pills, or the like, it is sometimes an hour and a half. Its first effect, in this case, is the making the patient cheerful, as if he had drank moderately of wine, and at the same time bold and above the fear of danger; for which reason the Turks always take it, when they are going to battle. A very immoderate dose brings on a sort of drunkenness, much like that occasioned by an immoderate quantity of strong liquors; cheerfulness and loud laughter at first, than a relaxation of the limbs, a loss of memory, and light-headedness; then vertigoes, dimness of the eyes, with a laxity of the cornea and a dilatation of the pupils, a slowness of the pulse, redness of the face, relaxation of the under jaws, swelling of the lips, difficulty of breathing, painful erection of the penis, convulsions, cold sweats, and finally death. Those who escape are usually relieved by a great number of stools, or profuse sweats. People who have gradually accustomed themselves to an immoderate use of opium, are subject to relaxations and weaknesses of all the parts of the body: they are apt to be faint, idle and thoughtless; and are generally in a stupid and uncomfortable state, except just after they have taken a fresh dose: in short, they lose their appetite, and grow old before their time.

Prepared opium, commonly called ex-

tract of opium, is made by dissolving opium in a sufficient quantity of water with a gentle heat; then straining the solution from the fæces, and evaporating it to the consistence of honey. Tincture of opium, or liquid laudanum, otherwise called the thebaic tincture, is made as follows: take of prepared opium two ounces; of cinnamon and cloves, each one drachm: of white-wine, one pint: infuse them a week without heat, and then filtre it through paper. Quincy observes of this preparation, that the addition of the spices are of no use.

OPOBALSAMUM, in the materia medica, the same with the true balsam. See the article BALSAM.

OPOPANAX, in the materia medica, is a gum-resin of a tolerably firm texture, usually brought to us in loose granules or drops, and sometimes in large masses, formed of a number of these, connected by a quantity of matter of the same kind; but these are usually loaded with extraneous matter, and are greatly inferior to the pure loose kind. The drops or granules of the fine opopanax, are on the outside of a brownish-red colour, and of a dusky-yellowish or whitish colour within: they are of a somewhat unctuous appearance, smooth on the surface; and are to be chosen in clear pieces, of a strong smell, and acrid taste.

On importation, opopanax pays a duty of 1 s. 3½ d. per pound; and draws back, on exportation, 1 s. 10 d.

Opopanax is attenuating and discutient, and is gently purgative; it dispels flatulencies, and is good in asthmas, in inveterate coughs, and in disorders of the head and nerves. It also promotes the menses, and is good against all obstructions of the viscera.

OPOSSUM, in zoology, a species of didelphis, with the paps within the abdomen. See the article DIDELPHIS.

The opossum is a very singular animal, about fifteen inches long from the extremity of the nose of the rump; and its tail is equal in length to the whole body: the legs are robust, and the feet armed with sharp, long and crooked claws. But what is most singular in this animal, is, that the skin of the belly of the female is loose, forming a kind of pouch or bag, with an aperture in it, at which, in time of danger, it takes in its young. See plate CLXXXVIII. fig. 6.

OPPILATION, in medicine, the act of obstructing or stopping up the passages of

of the body, by redundant or peccant humours. This word is chiefly used for obstructions in the lower belly.

OPPILATIVES, the same with deobstruent medicines. See **DEOBSTRUENTS**.

OPPELEN, a city of the kingdom of Bohemia, in the duchy of Silesia: east long. $17^{\circ} 23'$, north lat. $50^{\circ} 45'$.

OPPENHEIM, a town of Germany, in the palatinate of the Rhine.

OPPONENT, a person who withstands or opposes another.

This term is chiefly used in scholastic or academic disputes or exercises, where a person who opposes a thesis, or impugns it by his objections, is called opponent.

OPPOSITES, *opposita*, among logicians, simply taken, are such things as differ among themselves, but so as not to differ in like manner from some third. The schoolmen reckon four kinds of opposites, *viz.* relatively, contrarily, privatively, and contradictorily opposites.

Opposites complexly taken, are propositions that clash with each other, as man is an animal, and man is not an animal.

OPPOSITE ANGLES. See **ANGLE**.

OPPOSITE CONES. See **CONE**.

OPPOSITE SECTIONS, are two hyperbolas made by cutting two opposite cones by the same plane. See the articles **HYPERBOLA** and **CONIC SECTIONS**.

OPPOSITION, in logic, the disagreement between propositions, which have the same subject and the same predicate. See the article **PROPOSITION**.

OPPOSITION, in astronomy, is that aspect or situation of two stars or planets, wherein they are diametrically opposite to each other, or 180° asunder. See **PLANET**, **ORBIT**, **SYZYG**, &c.

OPPOSITION, in geometry, the relation of two things, between which a line may be drawn perpendicular to both.

OPPOSITION, in rhetoric, a figure whereby two things are joined, which seem incompatible; as *a wife folly*.

OPTATIVE MOOD, in grammar, that which serves to express an ardent desire or wish for something. See **MOOD**.

In most languages, except the Greek, the optative is only expressed by prefixing to the subjunctive an adverb of wishing, as *utinam*, in latin; *plut a Dieu*, in french, and *would to God*, in english; but in greek, it is expressed by a peculiar inflection, *αιμι, οισ, οι, &c.*

OPTERIA, in antiquity, presents made by a bridegroom to his bride, when

first conducted to him. See **BRIDE**, &c.

OPTICS, *optica*, taken properly and simply, is that science which teaches the properties of direct vision; but in a larger sense, it may comprehend the whole doctrine of light and colours, and all the phænomena of visible objects. In this large sense, the incomparable Sir Isaac Newton calls his book of light and colours, optics; or it is a mathematical science that treats of light in general, and of every thing that is seen with direct rays; and explains the several properties and effects of vision in general, and properly of that which is direct and ordinary. For when the rays of light are considered as reflected, the science which teaches their laws and properties, is called catoptrics; and when the refraction of rays is considered, and the laws and nature of it explained and demonstrated, the science is called dioptrics. So that optics comprehends the whole, of which catoptrics and dioptrics are the two parts.

Optics makes likewise a considerable branch of natural philosophy, both as it explains the laws of nature, according to which vision is performed; and as it accounts for abundance of physical phænomena, otherwise inexplicable. For what can be determined about light, colours, transparency, opacity, meteors, the rainbow, parhelia, &c. but on principles of optics? What about the nature of the stars? The structure of the mundane system? The motion of the planets? The eclipses of the luminaries, &c. Hence optics makes also a considerable part of astronomy. The best writers on this subject are Sir Isaac Newton and Dr. Smith.

OPTICAL PLACE. See **PLACE**.

OPTIMATES, in roman antiquity, were, according to Tully, the best citizens, who desired their actions might be approved of by the better sort; and the populares, those, who out of a thirst of vain-glory, did not consider so much what was right, as what would please the populace.

Others will have the optimates to have been those persons of whatever rank, who stood up for the dignity of the chief magistrates, and who cared not if the inferior members of the common-wealth suffered for the advancement of the commanding powers: whereas the populares were those who courted the favour of the commons,

commons, by encouraging them to sue for greater privileges.

OPUNTIA, **INDIAN-FIG**, in botany, a species of cactus, distinguished by being ramose and dichotomous. See the article **CACTUS**.

It is on this plant that the cochineal animal feeds. See **COCHINEAL**.

OR, in heraldry, denotes yellow, or gold-colour. See **COLOUR** and **METAL**.

In the coats of noblemen, it is blazoned topaz; and in those of sovereign princes, sol.

It is represented in engraving by small points or dots, scattered all over the field or bearing. See pl. **CLXXXVIII**, fig. 3.

ORACLE, among the heathens, was the answer which the gods were supposed to give to those who consulted them upon any affair of importance; it is also used for the god who it was thought gave the answer, and the place where it was given.

The credit of oracles was so great, that in all doubts and disputes their determinations were held sacred and inviolable: whence vast numbers flocked to them for advice about the management of their affairs; and no business of any consequence was undertaken, scarce any peace concluded, any war waged, or any new form of government instituted, without the advice and approbation of some oracle. The answers were usually given by the intervention of the priest or priestess of the god who was consulted, and generally expressed in such dark and intermediate phrases, as might be easily wrested to prove the truth of the oracle whatever was the event. It is not, therefore, to be wondered at, that the priests who delivered them were in the highest credit and esteem; and that they improved this reputation greatly to their advantage. They accordingly allowed no man to consult the gods, before he had offered costly sacrifices, and made rich presents to them. And to keep up the veneration for their oracles, and to prevent their being taken unprepared, they admitted persons to consult the gods only at certain stated times; and sometimes they were so cautious, that the greatest persons could obtain no answer at all. Thus Alexander himself was peremptorily denied by the pythia, or priestess of Apollo, till she was, by downright force, obliged to ascend the tripes; when, being unable to resist any longer, she cried out, *thou art invincible*; and these words

were accepted instead of a farther oracle.

The principal oracles of antiquity were,
 1. The oracle of Dodona, where there was a temple consecrated to Jupiter: the priests who delivered these oracles were called felli; but in latter ages they were pronounced by three old women. Near the temple of Dodona was a sacred grove of oaks, which were said to be endued with a human voice, and a prophetic spirit; the reason of which fiction seems to have been, that the priests often concealed themselves within the hollow of these trees, and from thence delivered oracles.
 2. The oracle of olympian Jupiter at Elis.
 3. The oracle of Apollo at Delphi, where it was pretended that an inspiring vapour arose from the mouth of a deep cavern, on which the pythia being placed on a three legged stool, received the divine afflatus, and became inspired: this oracle was the most famous of all others.
 4. The oracle of Trophonius, at Lebadea, a city in Boeotia, at which, after a number of ceremonies were performed, the votary descended into Trophonius's cave, where future events were revealed to him in a very extraordinary manner. It is remarkable, that all who consulted this oracle, seemed to be frightened out of their senses; for some time after, they became pensive and melancholy, their tempers were soured, and their countenances, however gay and pleasant before, were rendered dull and heavy.
 5. The oracle of Amphiaraus, the answers of which were delivered in dreams, while the person slept on the skin of the victim he had sacrificed.
 6. That of Mercury, at Pharæ, a city of Achaia, where those who wanted information, after offering frankincense upon the altar, and presenting a piece of money, placed their ear to the statue, and then stopping both ears till they were at some distance, took away their hands, and received the first voice they heard as a divine oracle.
 7. The oracle of Hercules at Bura, where was a cave in which was placed the statue of Hercules: here they who consulted the god first addressed themselves to him by prayer; then taking four dice out of a great heap that lay ready, they threw them upon the table, and as all the dice had particular marks, they were interpreted, and the answer given by consulting a book kept for that purpose.
 8. At Patræ, a city on the sea-coast of Achaia, was a temple of Ceres, before

before which was a fountain which delivered oracles only on the event of diseases, by letting down a looking-glass so low, that the bottom might just touch the surface of the water; when from the various figures represented in it, conjectures were formed concerning the patient. Besides these, there were several others, as that of Æsculapius at Epidaurus, that of Bacchus at Amphiclea, that of Orpheus's head, at Lesbos, &c.

ORACH, *atriplex*, in botany. See the article **ATRIPLEX**.

ORAL, something delivered by word of mouth, without being committed to writing; in which sense we say, oral law, oral tradition, &c.

ORAN, a city and port-town of Barbary, under the meridian of London: north lat. $36^{\circ} 30'$.

ORANGE-TREE, *aurantium*, in botany. See the article **AURANTIUM**.

Orange-flowers are justly esteemed one of the finest perfumes; and though little used in medicine, yet the water distilled from them is accounted stomachic, cordial and carminative. The fruit is cooling and good in feverish disorders, and particularly in diarrhoeas. Orange-peel is an agreeable aromatic, proper to repair and strengthen the stomach, and give a very grateful flavour to any infusions or tinctures, into whose compositions they enter. Oranges and lemons pay, on importation, a duty of 3 s. $10\frac{20}{100}$ d. the thousand; and draw back, on exportation, 3 s. $4\frac{1}{2}$ d.

ORANGE-COLOUR, among dyers, one that partakes equally of red and yellow. See the articles **COLOUR** and **DYEING**.

ORANGE, in geography, a city of Provence, in France, capital of the principality of Orange: it is situated on the east side of the river Rhone, seventeen miles north of Avignon: east long. $4^{\circ} 46'$, north lat. $44^{\circ} 10'$.

ORANGEADE, a drink made of orange-juice, water, and sugar, said to be good in fevers.

ORANGERY, in gardening, a gallery exposed to the south, but well closed with glass-windows, to preserve orange-trees in winter.

It likewise denotes the parterre, where the orange-trees are exposed in kindly weather.

ORATION, in rhetoric, a speech or harangue, composed according to the rules of oratory, and spoke in public.

Orations may be all-reduced to three

kinds, *viz.* the demonstrative, deliberative, and judicial. To the demonstrative kind belong panegyrics, genethliaca, epithalamia, congratulations, &c. To the deliberative kind belong persuasion, exhortation, &c. And to the judicial kind belong accusation, confutation, &c. See **PANEGYRIC**, **GENETHLIACUM**, &c.

Funeral ORATION. See **FUNERAL**.

ORATORIO, in the italian music, a sort of sacred drama of dialogues; containing recitativos, duettos, trios, ritornellos, choruses, &c.

The subjects of these pieces are usually taken from the scriptures, or from the life of some saint, &c.

The music for the oratorio should be in the finest taste, and best chosen strains. These oratorios are greatly used at Rome, in time of lent; and, of late, in England.

ORATORY, *oratoria*, the art of speaking well, otherwise called rhetoric. See the article **RHETORIC**.

ORATORY, among the romanists, a closet or like apartment near a bed-chamber, furnished with an altar, crucifix, &c. for private devotion.

There are two congregations of religious, one in Italy, the other in France, which are called priests of the oratory; but it ought to be observed, that the members are not, properly speaking, religious, being obliged to make no vows, and their institute being purely ecclesiastical.

ORB, *orbis*, in astronomy, &c. denotes an hollow globe or sphere. See the articles **GLOBE** and **SPHERE**.

ORBICULARE OS, in anatomy, a little bone of the ear, so called from its figure. See the article **EAR**.

ORBICULARIS, in anatomy, an appellation given to the constrictor-muscle of the lips; as also to the constrictor of the upper eye-lid, which is single, and rises from the upper apophysis of the maxillary bone, near the larger canthus of the eye, and surrounds the eye-lid with a series of orbicular fibres, serving to shut it; and, in this action, it also depresses and draws forward the eye brow, and elevates the lower eye-lid.

Some also give the name of orbicularis intestini to the sphincter of the anus.

ORBIS, the **GLOBE-FISH**, a name given to two species of ostracion, nearly as broad as long, and covered with spines. See the article **OSTRACION**.

ORBIS MAGNUS, in astronomy, denotes the earth's orbit, in its annual revolution round the sun.

ORBIT,

ORBIT, *orbita*, in astronomy, the path of a planet or comet, or the curve that it describes in its revolution round its central body: thus the earth's orbit is the curve which it describes in its annual course, and usually called the ecliptic. See the article **ECLIPTIC**.

The orbits of all the planets are ellipses having the sun in their common focus; in which curve they move according to the invariable law mentioned below.

However, the orbit of the earth is considerably disfigured by the action of the moon; as is also the orbit of saturn by the action of jupiter, when they happen to be in conjunction.

Though the orbits of the planets be elliptical, not circular, yet that they are very little so, even in the most excentric orbit, as that of mercury, will appear by comparing their excentricities with their mean distances from the sun. Thus, suppose the mean distance of the earth from the sun be divided into 1000 equal parts, then in those parts we have, in
 Merc. CS:DS::80:387::1:4,84
 Venus, CS:DS::5:723::1:144,6
 Earth, CS:DS::17:1000::1:19
 Mars, CS:DS::141:1524::1:10,8
 Jupiter, CS:DS::250:5201::1:20,8
 Saturn, CS:DS::547:9538::1:17,4

It is found by experience, that the orbits of the planets are quiescent, or that the line of the apsidal AP (plate CLXXXIX. fig. 1. n° 1.) always keep one and the same position with respect to the fixed stars: and the aphelium, or point A, possesses different points in the ecliptic in the several orbits, as in the foregoing synopsis. That the earth's orbit is elliptical, is well known from common experience; for were the orbit circular, the sun's apparent diameter would always be the same; but we find it is not, for if it be measured with a micrometer in winter-time, it will be found considerably larger than in the summer, and it will be greatest of all when the sun is in the 8° of ♊ (which shews that is the place of the aphelium) it being then 32' 47"; whereas, when the sun is in the 8° of ♎, his diameter is but 31' 40".

Hence it is evident that the sun is really nearer to us in the midst of winter than in the midst of summer; but this seems a paradox to many, who think the sun must needs be hottest when it is nearest to us, and that the sun is apparently more distant from us in December than in June. As to the sun's being hotter,

it is true, it is so to all those places which receive his rays directly or perpendicularly; but we find his heat abated on account of the obliquity of the rays, and his short continuance above the horizon at that time. And, as to his distance, it is only with respect to the zenith of the place, not the center of the earth; since it is plain the sun may approach the center of the earth, at the same time that it recedes from the zenith of any place.

Agreeably to the sun's nearer distance in the winter, we observe his apparent motion is then quicker than in summer; for in the 8° of ♊ it is about 61' per day, but in 8° of ♎ his motion is but 57' per day. Accordingly, we find the summer half-year eight days longer than the winter half-year, as appears by the following computation, according to the new style.

| Summer half year | includes in | Winter half-year | includes in |
|------------------|-------------|------------------|-------------|
| March | 10½ days | Sept. | 7 days. |
| April | 30 | Oct. | 31 |
| May | 31 | Nov. | 30 |
| June | 30 | Dec. | 31 |
| July | 31 | Jan. | 31 |
| August | 31 | Feb. | 28 |
| Sept. | 23 | Mar. | 20½ |
| Sum. half. | 186½ | | 178½ |
| Wint. half. | 178½ | | |

The difference 8 days:

For the sun's attracting force being one part of the cause of the planet's motion, and this force always increasing and decreasing in the inverse ratio of the squares of the distances, it is evident the velocity of the planet will always be greater the nearer it is to the sun, and *vice versa*. Hence the motion of a planet is every where unequable, being constantly accelerated as it passes from A by D to P; and in the other half, from P to A, it is retarded.

Yet is this unequal motion of a planet regulated by a certain immutable law, from which it never varies; which is, that a line, drawn from the center of the sun to the center of the planet, does so move with the planet about the sun, that it describes elliptic area's always proportional to the times. That is, if when the planet moves slowest, it describes the arch Ad in a given time; and when it moves quickest, it describes the arch bP in the same time; then will the trilineal area ASd be equal to the other trilineal area bSP. To demonstrate this, let the time in which

which the planet moves through the periphery of its orbit to be divided into equal parts, and suppose that in the first part it described any right line AB (*ibid.* n^o 2.) by the projectile force in any direction, and the centripetal force conjointly; then in the second part of time it would proceed in the same right line to c , if nothing prevented; so that $Bc = AB$, as is manifest from the first law of motion. Draw the right lines SB , Sc , and the triangles ABS and BcS will be equal, as having equal bases AB , Bc , and the same altitude of the vertex S . But when the body comes to B , let the centripetal force act with a new impulse either equal to the former or unequal, and let it cause the body to decline from the right line Bc , and describe the right-line BC ; draw Cc parallel to BS , meeting BC in C ; and at the end of the second part of time the body will be at C , and in the same plane with the triangle ABS . Join SC , and because of the parallels SB and Cc , the triangle SBc will be equal to the triangle SBc , and therefore equal to the triangle SAB . By the same way of reasoning, if the centripetal force act successively in the points C , D , E , causing the body in each equal part of time to describe the right lines CD , DE , EF , &c. the triangles SCD , SDE , SEF , &c. will be equal, and all in the same plane.

In equal times, therefore, equal area's are described; and, by composition of ratio's, any sums of area's $SADS$, $SAFS$, are to each other as the times in which they are described. Let now the number of triangles be increased, and their breadth be diminished in infinitum; then will their perimeter ADF be ultimately a curve; and, therefore, the centripetal force, by which the body is drawn perpetually from the tangent to this curve, acts incessantly; and the area's described are also in this case proportional to the times of their description. Hence the velocity of the revolving body or planet is every where inversely, as the perpendicular let fall from the center S to the tangent of the orbit in the place of the planet. For the velocities in the points A , B , C , &c. are as the bases of the triangles AB , BC , CD , &c. as being the spaces described in the same time; and the bases of equal triangles are reciprocally as their perpendicular altitudes; and, therefore, since in the evanescent triangles ASB , ASC , &c.

the right lines Ac , Bd , Ce , &c. become tangents to the curve in the points A , B , C , &c. it is manifest the velocity in these points will be inversely, as a perpendicular from S let fall upon those tangent-lines produced.

Hence also it follows, that the times in which equal arches are described in any planetary orbits are directly as those perpendiculars, because they are inversely as the velocities.

ORBITELLO, a city and port-town of Italy, in the dutchy of Tuscany, situated on a bay of the Mediterranean: east long. 12° , north lat. $42^{\circ} 30'$.

ORCADES, the **ORKNEY-ISLANDS**. See the article **ORKNEY**.

ORCELLE, or **CANARY-WEED**, in botany, a species of *cladonia*. See the article **CLADONIA**.

ORCHARD, a plantation of fruit-trees. In planting an orchard, great care should be taken that the soil is suitable to the trees planted in it; and that they are procured from a soil nearly of the same kind, or rather poorer than that laid out for an orchard. As to the situation, an easy rising ground, open to the south-east, is to be preferred. Mr. Miller recommends planting the trees fourscore feet asunder, but not in regular rows; and would have the ground between the trees plowed, and sown with wheat and other crops, in the same manner as if it was clear from trees, by which means the trees will be more vigorous and healthy, will abide much longer and produce better fruit. If the ground has been pasture, the green-sward should be plowed in the spring before the trees are planted; and if it be suffered to lie a summer fallow, it will greatly mend it, provided it be stirred two or three times to rot the grass, and prevent the growing of weeds. At Michaelmas it should be plowed pretty deep, in order to make it loose for the roots of the trees, which if the soil be dry, should be planted in October; but if it be moist, the beginning of March will be a better season. If several sorts of fruit-trees are to be planted on the same spot, you should observe to plant the largest growing trees backwards, and so proceed to those of less growth, continuing the same method quite through the whole plantation; by which means the sun and air will more easily pass through the whole orchard. When you have planted the trees, you should support

port them with stakes, to prevent their being blown out of the ground by the wind; and the following spring, if the season should prove dry, cut a quantity of green turf, and lay it about the roots, with the grass downwards; by which means a great expence of watering will be saved; and after the first year they will be out of danger. Whenever you plow the ground betwixt these trees, you must be careful not to go too deep amongst their roots, which would greatly damage the trees; but if you do it cautiously, your stirring the face of the ground will be of great service to them: though you should observe, never to sow too near the tree, nor suffer any great rooting weeds to grow about them; because this would starve them, by exhausting the goodness of the soil, which every two or three years should be mended with dung or other manure, that will be absolutely necessary for the crops sown between. These trees, after they are planted out, will require no other pruning besides cutting off their bad branches, or such as cross each other.

ORCHESTRA, in the antient theatres, a place in the form of a semi-circle, where the dancing was performed.

In the greek theatres, the orchestra made part of the stage; but, among the Romans, it answered nearly to our pit; only that, in it were disposed the seats for the senators, magistrates, vestals, and other persons of distinction.

ORCHIES, a town of the French Netherlands, in the province of Flanders, twelve miles south-east of Lille.

ORCHILLA, one of the Leeward-islands.

ORCHIS, **FOOL'S-STONES**, in botany, a genus of the gynandria-diandria class of plants, the corolla of which is of a corniculated form; and its fruit is an oblong unilocular capsule, containing numerous scobiform seeds.

Orchis root abounds with a glutinous juice, good for blunting acrid serous humours: it is also accounted an aphrodisiac, but on no good foundation.

ORDEAL, a form of trial, or of discovering innocence or guilt, formerly practised over almost all Europe, and which prevailed in England from the time of Edward the Confessor, till it was abolished by a declaration of Henry III. It was called *purgatio vulgaris*, or *judicium*, in opposition to *bellum* or combat, the other form of purgation; and

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was of various kinds, as that of fire, that of red hot iron, that of water, that of judicial pottage, that of hallowed cheese, that of the green cross, and that of dice laid on relics covered with a woollen cloth. To each of which kinds particular masses were appointed.

In England, an offender, on being arraigned and pleading not guilty, had it in his choice to put himself upon God and his country; that is, upon the verdict of a jury; or upon God alone, on which account it was called the judgment of God, it being presumed that God would deliver the innocent. The more popular kinds of ordeal were those of red-hot iron and water; the first for freemen and people of fashion, and the last for peasants. That by fire, as practised here, was the person's walking barefooted and blindfold over nine red-hot plough-shares; and if he escaped unhurt, he was acquitted, otherwise condemned. That of water was of two kinds, *viz.* either with hot water or cold; the former was where the person suspected put his arm or leg into scalding water, and brought it out unhurt; and the latter was when his body was not, contrary to the course of nature, borne up by the water.

ORDER, in architecture, is a system of the several members, ornaments and proportions of columns and pilasters; or a regular arrangement of the projecting parts of a building, especially the column, so as to form one beautiful whole.

M. Le Clerk defines an order to be a column charged with an entablature, and supported on a pedestal.

The origin of orders may be said to be almost as antient as human society. The rigour of the seasons first put men upon making little cabbins to retire into; at the first they were made half under ground, and half above, and were covered with stubble; but, in time growing more expert, they placed trunks of trees on end, and laid others a-cross, to bear up the covering. See the article **ARCHITECTURE**.

From hence they took the hint of more regular architecture, the trunks of trees upright representing columns; and the girds or bands which served to keep the trunks from bursting, expressed bases and capitals; and the summers which lay a-cross, gave the hint of entablatures; and likewise, the coverings, ending in points, gave a notion of pediments. This

hypothesis we have from Vitruvius, and it has been well illustrated by M. Blondel. See the article *COLUMN*, &c.

Others are of the opinion that columns take their rise from the pyramids which were erected by the antients over tombs; and that the urns wherein their ashes were inclosed, represented the capitals, the abacus of which was a brick laid over to cover the urn: but Vitruvius's account seems the most natural. See the article *ABACUS*, &c.

In time, the height of columns, was regulated by the Greeks on the foot of the proportion of a human body. The doric represented a man of a strong robust make, the ionic that of a woman, and the corinthian that of a girl; their bases and capitals were their shoes, head dress, &c. The three Greek orders represent three different manners of building, viz. the solid, mean, and delicate; the two Italian ones are imperfect productions of these.

The little regard the Romans had for the last, appears from this, that we meet not with one instance in the antique where they are intermixed.

Daviler observes, that the abuse the moderns have introduced by the mixture of the greek and latin orders, arises from their want of reflection on the use which the antients made thereof.

To give a general idea of the orders, it will be necessary to observe that the whole is composed of two parts, at least, viz. the column and the entablature; and of four parts, at the most, where there is a pedestal under the columns, and one acroter or little pedestal on the top of the entablature.

That the column has three parts, viz. the base, the shaft, and the capital; the entablature has three likewise, viz. the architrave, the frieze, and the cornice; which parts are all different in the several orders, having each their particular characters and members called by the general names of mouldings or ornaments. See the article *BASE*, &c.

These orders took their names from the people among whom they were invented. Scammozzi calls the tuscan, the gigantic; the doric, the herculean; the ionic, the matronal; the composite, the heroic; and the corinthian, the virginal.

An order of columns is usually understood of a column bearing its entablature; but the order is scarcely complete,

except the column be raised on a pedestal. The pedestal, column, and entablature are three compound parts, each consisting of three others, as has been said before. The antients have given us five several orders of columns, the tuscan, doric, ionic, composite, and corinthian. See the articles *TUSCAN*, *DORIC*, &c.

Disposition of the ORDERS. These ought to be so disposed in building, that the most solid may be placed undermost; as being the most proper to sustain the weight, and to give the whole edifice a more firm foundation: therefore the doric must always be placed under the ionic, the ionic under the corinthian, and the corinthian under the composite. As to the tuscan, being a plain rude order, it is seldom used above ground, except in villas, where one order only is employed. In very large buildings, as amphitheatres, where many orders are required, the tuscan may be placed under the ionic instead of the doric. But if you are desirous to leave out any of these orders, as for instance, to place the corinthian immediately over the doric, you may, provided you always observe to place the most strong and solid undermost, for the reasons above-mentioned.

As to the proportions, any height being given, divide it into ten equal parts, called diameters, or the thickness of the shaft at the bottom, for the tuscan order; the pedestal having two, the column seven, and the entablature one and three quarters. The doric order contains twelve such parts or diameters, and one third; the ionic, thirteen and an half; the corinthian, fourteen and an half; and the composite fifteen and a third such parts, which are distributed as expressed in the figure of each. See the articles *TUSCAN*, *DORIC*, &c.

Intercolumniation of the ORDERS. See the article *INTERCOLUMNIATION*.

But besides these regular orders, there are others to be met with; as the attic, gothic, persian, rustic, &c. See the articles *ATTIC*, *GOTHIC*, &c.

ORDER is also used for a division or class of any thing: thus, the tribe of animals called birds, is subdivided into six orders. See the article *ORNITHOLOGY*.

Holy ORDERS, a character peculiar to ecclesiastics, whereby they are set apart for the ministry. See *ORDINATION*.

Military ORDERS, are companies of knights, instituted by kings and princes; either for

for defence of the faith, or to confer marks of honour, and make distinctions among their subjects.

Religious ORDERS, are congregations or societies of monastics, living under the same superior, in the same manner, and wearing the same habit.

ORDERS of curves, in geometry. See the article CURVE.

ORDINAL, *ordinale*, a book containing the order, or manner of performing divine service. See RITUAL.

ORDINAL NUMBERS. See NUMBER.

ORDINANCE, or ORDONNANCE, a law, statute, or command of a sovereign, or superior: thus the acts of parliament are sometimes termed ordinances of parliament.

ORDINARII, in antiquity, a sort of gladiators. See GLADIATORS.

ORDINARY, in general, signifies, common, usual; thus, an ambassador or envoy in ordinary, is one sent to reside statedly, and for a number of years, in the court of some foreign prince or state, in order to keep up a good understanding, and watch over the interest of his own nation.

This term is also applied to several officers in the king's household, who attend on common occasions. Thus we say, physician in ordinary, &c.

ORDINARY, in civil law, is any judge invested with authority to take cognizance of causes in his own right, and not by deputation.

ORDINARY, in common and canon law, is one who has ordinary or immediate jurisdiction in ecclesiastical causes in such a place. In which sense archdeacons are ordinaries, tho' the appellation is more frequently given to the bishop of the diocese, who has the ordinary ecclesiastical jurisdiction. The archbishop is the ordinary of the whole province, to visit and receive appeals from inferior judicatures. The romish canonists call the pope ordinary of ordinaries, since by the lateran council he has usurped the right of collating by prevention to all benefices, in exclusion of the ordinary collators.

ORDINARY of *assise and sessions*, was a deputy of the bishop of the diocese, anciently appointed to perform divine service for malefactors, and assist in preparing them for death.

ORDINARY of *Newgate*, a clergyman, who attends in ordinary upon the malefactors

in that prison, preaches and reads prayers in the chapel to all the prisoners, and attends and prays with the condemned malefactors at the place of execution.

ORDINARY, or *honourable* ORDINARY, in heraldry, a denomination given to certain charges properly belonging to that art. The honourable ordinaries are ten in number; *viz.* the chief, pale, bend, fesse, bar, cross, saltier, chevron, bordure, and orle. For which see the articles CHIEF, PALE, &c.

ORDINATES, or ORDINATE APPLICATES, in geometry, are parallel lines, MM, *mm*, (plate CLXXXVIII. fig. 4.) terminating in a curve, and bisected by a diameter, as AD. The half of these, as MP, *mp*, is properly the semi-ordinate, though commonly called ordinate. See the articles CURVE, PARABOLA, HYPERBOLA, &c.

ORDINATION, the act of conferring holy orders, or of initiating a person into the priesthood by prayer, and the laying on of hands. Ordination has always been esteemed the principal prerogative of bishops, and they still retain the function as a mark of spiritual sovereignty in their diocese. Without ordination, no person can receive any benefice, parsonage, vicarage, &c. A clerk must be twenty-three years of age before he can have any share in the ministry; and twenty-four, before he can be ordained, and by that means be permitted to administer the sacraments. A bishop, on the ordination of clergymen, is to examine them in the presence of the ministers who assist him at the imposition of hands; and in case any crime, as drunkenness, perjury, forgery, &c. be alledged against any one that is to be ordained, either priest or deacon, the bishop ought to desist from ordaining him. The person to be ordained is to bring a testimonial of his life and doctrine to the bishop, and give an account of his faith in latin, and both priests and deacons are obliged to subscribe the thirty-nine articles.

The ordination days in the church of England, are the four Sundays immediately following the Ember-weeks, *viz.* the first Sunday in Lent, Trinity-Sunday, and the Sundays following the first Wednesday after Sept. 14. and Dec. 13.

In Scotland, where there are no bishops, the power of ordination is lodged in the presbytery. See PRESBYTER.

ORDNANCE, a general name for all sorts of great guns, used in war. See the articles **CANNON** and **GUN**.

Office of ORDNANCE, an office kept within the Tower of London, which superintends and disposes of all the arms, instruments, and utensils of war, both by sea and land, in all the magazines, garrisons and forts in Great Britain.

The officers of the ordnance are, 1. The master-general, from whom are derived all orders and dispatches relating to the same. 2. The lieutenant-general, who receives orders from the master-general, and sees them duly executed; orders the firing of guns on days of rejoicing, and sees the train of artillery fitted out when ordered to the field. 3. The surveyor-general, who has the inspection of the ordnance, stores, and provisions of war in the custody of the store-keepers: he allows all bills of debt, keeps a check on labourers, &c. 4. The treasurer, thro' whose hands passes the money of the whole office, as well for payment of salaries as debentures; as also a clerk of the ordnance, and a clerk of the deliveries, for which see the articles **CLERK of the ordnance**, &c.

ORDONNANCE, in painting, is used for the disposition of the parts of a picture, either with regard to the whole piece, or to the several parts; as the groups, masses, contrasts, &c.

In the ordonnance there are three things to be regarded, *viz.* the place or scene, the distribution, and the contrast.

1. As to the first, regard is to be had to the disposition of things which serve as a ground-work; and to the plan and position of bodies; under the former of which, comes the landscape, whether an uninhabited place, where there is full liberty of representing all the extravagancies of nature; or inhabited, where the signs of cultivation, &c. must be exhibited. See the article **LANDSKIP**.

As to the plan of bodies, they are either solid, which again are either so by nature, and must be proportioned to their places; or artificial, where regard must be had to the rules of geometry, perspective, architecture, &c. Or the bodies move; which they do either by a voluntary motion, wherein great regard must be had to proportion them to their situation, and to strengthen them by regarding the equilibrium; or by some extraordinary power, as machines, &c. where the causes of their motion must

appear. Or they are things at a distance, in all which an even plane must still be proposed, to find their precise situation, and settle their place by sudden breaks and distances agreeably to perspective.

In placing the figures, regard is to be had, 1. to the group, which connects the subject, and stays the sight. In this are to be considered the knot or nodus, which binds the group, and the nearness of figures which as it holds them together, may be called the chain: that the group be sustained by something loose and distinct from it, and by the same joined and continued to the other groups; and that the lights and shadows be so disposed, as that the effects of all the parts of a composition may be seen at once. See the article **GROUP**.

2. As to the actions, forced attitudes are to be avoided, and simple nature should be shewn in her most advantageous postures.

3. As to the drapery, which is to be adjusted, so as it may appear real garments, and not stuff loosely thrown on, See the article **DRAPERY**.

4. In the contrast, are to be considered the actions, which vary infinitely; the aspects which in actions of the same kind, may, by their difference, make a contrast; the situation, according as they meet above, or under the sight, or are near or at a great distance. And lastly, custom, which indeed extends to all the parts of painting: tho' this is particularly to be regarded in the ordonnance, it is nevertheless to be followed with discretion, taking care to avoid all stiffness and formality.

ORDONNANCE, in architecture, is the composition of a building, and the disposition of its parts, both with regard to the whole, and to one another; or as Mr. Evelyn expresses it, determining the measure of what is assigned to the several apartments. Thus ordonnance is the judicious contrivance of the plan or model; as when the court, hall, lodgings, &c. are neither too large nor too small, but the court affords convenient light to the apartments about it; the hall is of fit capacity to receive company; and the bed chambers, &c. of a proper size. When these divisions are either too great or too small, with respect to the whole, as where there is a large court to a little house, or a small hall to a magnificent palace, the fault is in the ordonnance.

ORDUN.

ORDUNNA, a port-town of Spain, in the province of Biscay: west long. $3^{\circ} 30'$, north lat. $43^{\circ} 15'$.

ORE, in natural history, the compound mineral glebe, earth, stone, or other substance; which is rich enough in metallic particles, to be worth the while of being purified; and by this means to separate the metal from it, whether gold, silver, copper, iron, tin, &c. See the articles METAL, GOLD, SILVER, &c.

Ores then are nothing but natural concretes, of metals or semi-metals, mixed with sulphur or arsenic, or with both together; and when such alliances are made by art, we then say, that the metals, or semi-metals are reduced to the state of ores. Some ores are so kindly as to melt readily of themselves; whereas others are so intractable, that they require the assistance of various fluxes, before they will yield the metal. See the article FLUX.

Assayers therefore distinguish ores into fusible, refractory, and not fusible at all. Those are called fusible, which, either by means of a middling fire only, or by adding a fit menstruum to them, melt easily, so as to afford the metal or semi-metal contained in them. The refractory ores are those, which require a very strong and lasting action of the fire, and the addition of proper fluxes, before they will melt in the requisite manner.

All ores lie hidden in earths, stones, or in other minerals, as in matrices; if then these matrices of themselves melt in the fire with very great difficulty, or not at all, the ore contained in them may indeed of its own nature be put in fusion; but yet cannot be delivered of its matrix, because this is not fusible: such are iron-ore, and almost all earths and stones, except the vitrifiable ones; but lime-stone in particular, and stones affected in the same manner in the fire, render the ores intermixed with them the most stubborn of any. Some of these stones, however, being much lighter than the ores, may be easily separated by only pounding, washing, and extinguishing them in water; or by a previous calcination, leaving the weightier particles of the ore at the bottom of the vessel, or trough: these kinds of ores are called decantable; as those ores are called indecantable, which cannot be separated in this manner; and of this last sort are the light brittle ores, that contain a great quantity of sulphur. Finally, if there is in the body of the ore itself any thing intangled,

or only adhering to its outside, that will cause the metal contained in it to vanish into a vapour, or turn it to scoria with itself, while the ore is exposed to the fire; then such an ore is said to be hungry, *minera rapax*: the causes of this are commonly arsenic, antimony, and those minerals out of which zinc is produced.

OREBRO, the capital of the province of Nericia, in Sweden; east long. 15° , north lat. $59^{\circ} 20'$.

OREGRUND, a port-town of Sweden, in the province of Upland: east long. $18^{\circ} 15'$, north lat. $60^{\circ} 30'$.

ORENSE, or ORTENSE, a city of Spain, in the province of Galicia: west long. $8^{\circ} 20'$, north lat. $42^{\circ} 36'$.

ORFA, a town of Asiatic Turkey, in the province of Diarbec: east long. 40° , north lat. $36^{\circ} 15'$.

ORFORD, a borough and port-town of Suffolk, thirty miles east of Bury. It sends two members to parliament.

ORGAL, among dyers, denotes the lees of wine dried. See DYEING.

ORGAN, *οργανον*, in general, is an instrument, or machine designed for the production of some certain action or operation; in which sense, the mechanic powers, machines, and even the veins, arteries, nerves, muscles, and bones of the human body, may be called organs. See the articles POWER, MACHINE, VEIN, ARTERY, &c.

The organs of sense are those parts of the body, by which we receive the impressions or ideas of external objects; being commonly reckoned five, *viz.* the eye, ear, nose, palate, and cutis. See the articles SENSE, EYE, EAR, &c.

ORGAN, in music, the largest and most harmonious wind-instrument.

The invention of the organ is very ancient, though it is agreed that it was very little used till the eighth century. It seems to have been borrowed from the Greeks. Vitruvius describes an hydraulic one in his tenth book of architecture. The emperor Julian has an epigram in its praise. St. Jerome mentions one with twelve pair of bellows, which might be heard a thousand paces, or a mile; and another at Jerusalem, which might be heard at the mount of Olives.

There is one in the cathedral church of Ulm, in Germany, that is ninety three feet high; and twenty-eight broad; the biggest pipe is thirteen inches in diameter, and it has sixteen pair of bellows.

The modern organ is a buffet, containing several

several rows of pipes. The size of the organ is generally expressed by the length of its biggest pipe; thus we say an organ of thirty-two feet, of sixteen, of eight, and of two feet.

Church organs consist of two parts, *viz.* the main body, called the great organ; and the positive, or little organ, which is a small buffet, commonly placed before the great organ.

The organ has at least one set of keys, when it has only one body, and two or three when it has a positive or chair-organ: though large organs have four, and sometimes five sets of keys; besides which, the pedals or largest pipes have their keys, the stops or touches whereof are played by the feet. The keys of an organ are usually divided into four octaves, *viz.* the second sub-octave, first sub-octave, middle octave, and first octave. Each octave is divided into twelve stops or frets, whereof the several black ones mark the natural sounds, and the five white, the artificial ones, that is, the sharps and flats; so that the keys usually contain forty-eight stops, or touches. Some organists add to this number one or more stops in the third sub-octave as well as in the second. (Note, some harpsichords and spinnets have their natural stops or keys often marked white, and their artificial ones black.) The pedals have about two or three octaves, at the pleasure of the organist, so that the number of stops is indeterminate.

Each key or stop pressed down, opens a valve or plug which corresponds lengthwise with as many holes as there are rows of pipes on the sound-board: the holes of each row are opened and shut by a register, or ruler, pierced with forty-eight holes; by drawing the register, the holes of one row are opened, because the holes therein correspond with those of the sound-board, so that by opening a valve, the wind brought into the sound-board, by a large pair of bellows, finds a passage into the pipes, which correspond to the open holes of the sound-board; but by pushing the register, the forty-eight holes thereof not answering to any of those of the sound-board, that row of pipes answering to the pushed register are shut. Whence it follows, that by drawing several registers, several rows of pipes are opened; and the same thing happens, if the same register correspond to several rows. Hence the rows

of pipes become either simple or compound: simple, when only one row answers to one register; compound, where several. The organists say, a row is compound, when several pipes play upon pressing one stop.

The pipes of the organ are of two kinds; the one with mouths like our flutes; the other with reeds. The first, called pipes of mutation, consist, 1. of a foot, A A B B (pl. CLXXXIX. fig. 2. n° 1.) which is a hollow cone, and which receives the wind that is to sound the pipe. 2. To this foot is fastened the body of the pipe B B D D. Between the foot and the body of the pipe is a diaphragm, or partition, F E F, which has a long, but narrow aperture to let the wind out. Over this aperture is the mouth B B C; whose upper lip C, being level, cuts the wind as it comes out at the aperture.

The pipes are of pewter, of lead mixed with a twelfth part of tin, and of wood. Those of pewter are always open at their extremities: their diameter is very small, and their sound very clear and shrill. Those of lead, mixed with tin, are larger; the shortest open, the longest are quite stopped; the mean ones partly stopped, and having besides a little ear on each side the mouth, to be drawn closer, or set farther asunder, in order to raise or lower the sound. The wooden pipes are made square, and their extremity stopped with a valve, or tampion of leather. The sound of the wooden and leaden pipes is very soft; the large ones stopped, are usually of wood; the small ones of lead. The longest pipes give the greatest sound; and the shortest, the most acute: their lengths and widths are made in the reciprocal ratio's of their sounds; and the divisions regulated by their rule, which they call diapason. But the pipes that are shut, are of the same length as the open ones, which yield the same sound. Usually, the longest pipe is sixteen feet: though in extraordinary organs it is thirty-two. The pedal tubes are always open, though made of wood, and of lead.

A reed-pipe consists of a foot, A A B B, (*ibid.* n° 2.) which carries the wind into the shalot, or reed C D, which is a hollow demi-cylinder, fitted at its extremity D, into a kind of mould, by a wooden tampion G. The shalot is covered with a plate of copper, K K I I, fitted at its extremity I I, into the mould by the same wooden tampion. Its other extremity

K K,

KK, is at liberty; so that the air entering the shalot, makes it tremble or shake against the reed; and the longer that part of the tongue which is at liberty IL, is made, the deeper is the sound. The mould II, which serves to fix the shalot or reed, the tongue, tam-pion, &c. serves also to stop the foot of the pipe, and to oblige the wind to go out wholly at the reed. Lastly, in the mould is soldered the tube HH, whose inward opening is a continuation of that of the reed. The form of this tube is different in the different ranks of pipes. The degree of acuteness and gravity in the sound of a reed-pipe, depends on the length of the tongue, and that of the pipe CK, taken from the extremity of the shalot, to the extremity of the tube. The quality of the sound depends on the width of the reed, the tongue, and the tube; as also on the thickness of the tongue, the figure of the tube, and the quantity of wind.

To diversify the sounds of the pipes, they add a valve to the port-vent, which lets the wind go in fits or shakes.

Hydraulic ORGAN, denotes a musical machine that plays by means of water instead of wind. Of these there are several in Italy in the grottoes of vineyards. Ctesebes of Alexandria, who lived in the time of Ptolemy Evergetes, is said to have first invented organs that played by compressing the air with water, as is still practised. Archimedes and Vitruvius have left us descriptions of the hydraulic organ.

In the cabinet of queen Christina is a beautiful and large medallion of Valentinian, on the reverse whereof is seen one of these hydraulic organs; with two men, one on the right, the other on the left, seeming to pump the water which plays it, and to listen to its sound. It has only eight pipes, placed on a round pedestal.

ORGANICAL, in the antient music, was that part performed by instruments. See the article *MUSIC*.

The organical comprehended three kinds of instruments, *viz.* the wind instruments, as trumpets, flutes, hautboys, &c. stringed-instruments, as lutes, lyres, violins, harpsichords, &c. and pulsative instruments, or those played by beating with the hands or sticks, as drums, &c. See the several articles *TRUMPET*, &c.

ORGANICAL PART, is that part of an animal or plant, destined for the per-

formance of some particular function.

ORGANICAL DISEASE, a disease in an organical part of the body, whereby its function is impeded, suspended, or destroyed.

ORGANICAL description of curves, the method of describing them on a plane by means of instruments. See *CURVE*.

ORGANO, in music, signifies the thorough bass. It is usually scored with figures over the notes for the harpsichord, bass-viol, and lute.

ORGANO PICCILOLO, a chamber or little organ, used to play in a small room; being about two or three feet high, that is, its largest pipe is that length: it is made in a small buffet like the positive, or little organ of a church. See *ORGAN*.

ORGASM, *orgasmus*, an ecstasy, or impetuous desire of coition, occasioned by a turgescentcy of the seminal vessels.

Certain female animals have an orgasm at particular seasons of the year.

ORGIA, *orgia*, in antiquity, feasts and sacrifices performed in honour of Bacchus, instituted by Orpheus, and chiefly celebrated on the mountains by wild, distracted women, called bacchæ. See *BACCHANALIA* and *DIONYSIA*.

ORGIVA, a town of Spain, in the province of Granada, twenty-five miles south of Granada.

ORGUES, in the military art, are thick, long pieces of wood pointed at one end, and shod with iron, clear one of another; hanging each by a particular rope, or cord, over the gate-way of a strong place, perpendicularly, to be let fall in case of an enemy. Their disposition is such, that they stop the passage of the gate, and are preferable to hersees or portculises; because these may be either broke by a petard, or they may be stopped in their falling down; but a petard is useless against an orgue, for if it break one or two of the pieces, they immediately fall down again, and fill up the vacancy; or if they stop one or two of the pieces from falling, it is no hindrance to the rest.

ORGUES is also used for a machine, composed of several harquebuses or musquet-barrels, bound together, by means whereof several explosions are made at the same time, used to defend breaches and other places attacked.

ORGYA, an antient grecian measure, containing six feet. See *MEASURE*.

ORIA, a town of Italy, in the kingdom of Naples, and territory of Otranto, situated

ated thirty miles north-west of the city of Otranto.

ORICHALCUM, or **AURICHALCUM**, brass. See the article **BRASS**.

It is evident, from all accounts, that the orichalcum of the antients was a fictitious substance, not a natural metal: they made it on the same basis that we make brass at present, but they had several ways of doing it, and distinguished it into several kinds. They had a white sort in frequent use and great esteem: this was made by mixing an earth with copper while in fusion, but what that earth was we are not informed. We know several ways of turning copper white; one of which was much practised some years ago, and spoons, and other utensils made of it, had the name of alchymy-things: but this was done by means of arsenic, a thing not known to the antients: this therefore could not be the same with their white brass; and indeed, none of our methods seem to be the same with theirs, since the metal is debased by all ours, and becomes brittle, whereas in their management, according to their own accounts, it seems not to have lost any thing of its ductility, though it acquired a particular brightness. The orichalcum and *æs flavum*, brass and yellow copper, are with us synonymous terms, but with the antients they were used to express different combinations of the ingredients.

ORIENT, *oriens*, in geography and astronomy, the east, or east-point of the horizon; thus called, because it is the point where the sun rises. Hence the equinoctial orient is used for that point of the horizon wherein the sun rises, when he is in the equator, or when he enters the signs of aries and libra; æstival orient, is the point wherein the sun rises in the middle of summer, when the days are longest; and the hibernal orient, the point where the sun rises in the middle of winter, when the days are shortest.

ORIENTAL, something situated towards the east with regard to us, in opposition to occidental. See **OCCIDENT**.

ORIFICE, the mouth, or aperture of a tube, pipe, or other cavity.

In anatomy, this term is particularly applied to the mouths of the several ducts, vessels, and other cavities, as of the bladder, uterus, stomach, &c. See the article **BLADDER**, &c.

It is also used for the aperture of a wound, or ulcer. See **WOUND** and **ULCER**.

ORIGANUM, **WILD MARJORAM**, in botany, a genus of the didynamia-gymnospermia class of plants, the corolla whereof consists of a single ringent petal, the tube is cylindric and compressed, the upper lip is erect, obtuse, and emarginated, and the lower divided into three segments; there is no pericarpium, the cup is connivent, and contains four roundish seeds.

This plant is heating, dissolving, and stimulating; whence it is of use in exulceration of the lungs, &c. It is also adapted to diseases of the kidneys, and is balsamic.

ORIGENISTS, in church-history, a christian sect in the fourth century, so called from their drawing their opinions from the writings of Origen. The origenists maintained, that the souls of men had a pre-existent state, that they were holy intelligences, and had sinned in heaven before the body was created: that Christ is only the son of God by adoption, that he has been successively united with all the angelical natures, and has been a cherub, a seraph, and all the celestial virtues, one after another; that in future ages, he will be crucified for the salvation of the devils, as he has already been for that of men, and that their punishment, and that of the damned, will continue only for a certain limited time.

ORIGINAL, a first draught or design of any thing, which serves as a model to be imitated or copied.

ORIGINAL SIN, the crime of eating the forbidden fruit, of which it is said, all mankind are guilty at their conception by the imputation of Adam's transgression; which is accounted for by supposing that Adam, as he was to be the father, was also the foederal head, and representative of the whole human race; and that on his sinning, all that were to spring from him partook of his crime. Father Malebranche endeavours to account for original sin from natural causes, and supposes that our first parents, after their transgression, received such deep traces in their brain by the impression of sensible objects, that it was very possible they might communicate them to their children; and that as, according to the order established by nature, the thoughts of the soul are conformable to the traces in the brain, it may be said, that as soon

as we are formed in the womb, we are infected with the corruption of our parents: for having traces in the brain like those who gave us being, we necessarily have the same thoughts, and the same inclinations with regard to sensible objects; and that thus, of course, we must be born with concupiscence and original sin. See the article **CONCUPISCENCE**.

ORIGINALIA, in the exchequer, are transcripts, &c. sent to the remembrancer's office out of the court of chancery: which are thus called, to distinguish them from the recorda, which contain the judgments and pleadings in causes tried before the barons.

ORIGUELLA, a city of Spain, in the province of Valencia: west long. 50', north lat. 38° 20'.

ORILLON, in fortification, is a small rounding of earth faced with a wall; raised on the shoulder of those bastions that have casemates, to cover the cannon in the retired flank, and prevent their being dismounted by the enemy. See the articles **BASTION** and **FORTIFICATION**.

ORION, in astronomy, a constellation of the southern hemisphere; consisting of thirty-seven stars, according to Ptolemy; of sixty-two, according to Tycho; and of no less than eighty, in the Britannic catalogue.

ORION'S RING, in astronomy, a constellation more usually called **ERIDANUS**. See the article **ERIDANUS**.

ORISTAGNI, a city and port-town of the island of Sardinia: east long. 8° 30', north lat. 39° 30'.

ORIXA, the capital of the province of the same name, in the hither India, situated on the west side of the bay of Bengal.

ORKNEY ISLANDS, certain islands on the north of Scotland, from which they are separated by a frith twenty miles in length, and ten in breadth. These islands are forty in number, and together with the island of Zetland send one member to parliament, and another for the burghs of Kirkwall, &c.

ORLAMUND, or **ORLAMUNDA**, a town of Germany, in the circle of Upper Saxony, fifty miles south-west of Leipzig.

ORLE, **ORLET**, or **ORLO**, in architecture, a fillet under the ovolo or quarter round of a capital. When it is at the top or bottom of the shaft, it is called **cincture**. See the article **CINCTURE**.

Paladio uses the word **orlo**, for the plinth of the bases of the columns.

ORLE, in heraldry, an ordinary in form

of a fillet drawn round the shield, near the edge or extremity thereof, leaving the field vacant in the middle. Its breadth is but half that of the tressure or bordure, which contains a sixth part of the shield; and the orle, only a twelfth: besides that the orle is its own breadth distant from the edge of the shield, whereas the bordure comes to the edge itself. The form of the orle is the same with that of the shield, whence it resembles an escutcheon. See pl. **CLXXXVIII**. fig. 5. which represents an orle argent in a field gules.

ORLEANOIS, a province or government of France, bounded by Normandy and the isle of France, on the north; by Champaign and Burgundy, on the east; by Lyons and Guienne, on the south; and by Britany and the bay of Biscay, on the west.

ORLEANS, a city of France, capital of Orleanois, situated on the river Loire, in east long. 2°, north lat. 47° 55'.

ORLEANS is also the name of an island and town on the river of St. Laurence, in Canada: west longitude 73°, north latitude 47°.

ORLOPE, in the sea-language, the uppermost space or deck in a great ship, reaching from the main-mast to the mizen. In three-deck ships the second and lowest decks are sometimes called orlopes.

ORMOND, the north-division of the county of Tipperary, in Ireland.

ORMSKIRK, a market-town of Lancashire, situated twenty-six miles south of Lancaster.

ORMUS, an island at the entrance of the gulph of Persia, situated opposite to Gombion on the continent, in east long. 56°, north lat. 27° 30'.

This island is thirty miles in circumference.

ORNAMENTS, in architecture, are used to signify all the sculpture or carved-work wherewith a piece of architecture is enriched.

Vitruvius and Vignola also use the word to signify the entablature.

Ornaments in **relievo**, are those cut in the contours of the mouldings, as leaves, shells, scrolls, flowers, &c.

Ornaments in **creux**, are such as are cut within the mouldings, as eggs, flutes, &c. See the article **MOULDING**.

ORNITHOGALUM, **STAR OF BETHLEHEM**, in botany, a genus of the hexandria-monogynia class of plants, the corolla whereof consists of six petals, of a

lanceolated figure, from the base to the middle erect, from thence to the points planopate; they are permanent, but lose their colour: the fruit is a round angulated capsule, formed of three valves, and containing three cells; the seeds are numerous and roundish, the receptacle columnar.

The root of this plant is used both crude and boiled; and the seed is baked along with bread.

ORNITHOLOGY, that branch of zoology, which treats of birds. See **BIRD**. Linnæus, whose ornithology we have chiefly followed, arranges the whole class of birds under six orders, according to the different figures of their beaks, *viz.*

1. The accipitres, or birds with uncinate or hooked beaks. See plate **CXC.** fig. 1.

2. The picæ, or birds that have convex and compressed beaks, like that represented, *ibid.* fig. 2.

3. The anseres, comprehending such birds as have depressed, and dentated or serrated beaks, *ibid.* n^o 3.

4. The scolopaces, or those furnished with subcylindric and obtuse beaks. See *ibid.* fig. 5.

5. The gallinæ, or birds which have the beak of a conic form, but crooked, and the upper chap imbricated. *ibid.* fig. 5.

6. The passeres, or birds with conic and sharp-pointed beaks, like that represented *ibid.* fig. 6.

In the description of birds, the feet, wings, and tail, are chiefly attended to.

In most birds the toes are four in number, three standing forwards, and one backwards, as represented *ibid.* fig. 7, 8, 9. In some two toes stand forward, and two backward, *ibid.* fig. 10. Some feet, again, are palmated, or have the toes connected together by a membrane, *ibid.* fig. 9. and others semi-palmated. *ibid.* fig. 8.

With regard to the wings, the long quill-feathers, marked 1, 2, 3, &c. fig. 12. are called by authors *remiges*, as serving to fly with; and the other feathers, placed over the rest of the body, *rectrices*. The long feathers of the tail are called *rectrices*, as serving to steer the bird's course through the air, *ibid.* fig. 11.

As to the other terms made use of in the description of birds, they are these: *cera* expresses the membrane or naked

tunic, which surrounds and extends itself over more or less of the base of the beak; *urhopigium* is the rhump; and as to other terms, they will be found explained under their several heads.

ORNITHOMANCY, a species of divination, performed by means of birds; being the same with augury. See the articles **DIVINATION** and **AUGURY**.

ORNITHOPUS, **BIRD'S FOOT**, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower: its fruit is an oblong, jointed pod, of a cylindrical figure, and containing in each joint a single roundish seed: add to this, that several of these pods usually grow together.

The leaves of this plant are said to be good for an hernia, and for breaking and expelling the stone of the kidneys or bladder.

OROBANCHE, **BROOM-RAPE**, in botany, a genus of the didynamia-angiospermia class of plants, the corolla of which is monopetalous and ringent; and its fruit an oblong capsule formed of two valves, and containing a great many minute seeds.

The leaves of this plant, dried, and reduced to a powder, afford great relief in extreme pains of the colic; and its syrup is recommended against the hypochondriac affection.

OROBUS, **BITTER-VETCH**, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower, and a rounded bivalve pod for its fruit, containing numerous roundish seeds.

It agrees in virtues with *ervum*. See the article **ERVUM**.

ORONOQUE, a river of South America, which falls into the Atlantic ocean in 8° north lat. almost opposite the island of Trinity.

ORONTIUM, in botany, a genus of the hexandria monogynia class of plants, whose calyx is a single cylindric spadix, covered with floscules; the corolla consists of six permanent roundish petals; the fruit is a small follicle, immersed in the spadix with the corolla, and containing a roundish, fungous, and single seed.

ORPELLO, in the glass-trade, calcined bark reduced to a black powder.

OROPESA, a town of New Castile, fifty miles west of Toledo.

OROPEZA, a city of Peru: west long. 66°, south lat. 20°.

ORPHAN,

ORPHAN, a fatherless child, or minor; or one that is deprived both of father and mother.

The lord mayor and aldermen of the city of London have the custody of the orphans of deceased freemen, and also the keeping of their lands and goods. Accordingly, the executors of such freemen are to exhibit true inventories of their estates, and give security to the chamberlain of London for the orphan's part.

By statute of 5 and 6 Will. and Mary, c. 10. a certain fund is to be applied for the payment of debts due to orphans, by interest at 4 *per cent.* And no person is compellable to pay into the chamber of London, any sum of money or personal estate, belonging to the orphan of any freeman for the future.

ORPHUS, in ichthyology, the sparus with the tail not forked, and with a black spot near it. See the article **SPARUS**.

ORPIMENT, *auripigmentum*, in natural history, a fossile substance usually found in copper-mines, composed of thin flakes, like the talcs; which easily split, and are flexible, and not elastic, soluble in oil, fusible in a moderate fire, and yielding in burning an offensive smell like garlic.

Of this genus of fossils, there are only three known species: 1. A broad-flaked, gold-coloured kind, well known among the antients, as is plain from the description of it left us by Dioscorides, and much esteemed at present by our painters. This is found in several places, as in the islands of the Archipelago, in the mines of Gosselaer, in Saxony; in some parts of Turkey, and in the East-Indies, and in its utmost purity about Smyrna; this makes the finest of all yellows in painting. 2. The small-flaked, yellow kind, which is the common orpiment of the shops, and is a fine colour, though greatly inferior to the former. This is found in many parts of the turkish dominions, and in Germany. And, 3. Red-orpiment. This has been a name given by the more judicious to sandarach, and, by the vulgar, to red arsenic, but is to be restrained only to this fossile, which is of a fine bright red, and of the regular texture of the orpiments, and answering all their characters. This is a very beautiful substance of a fine bright red, very glossy, and a little transparent, and is found in

the turkish dominions, in the islands of the Archipelago, and even in Cornwall, where it is known under the name of red mundic.

The english druggists are guilty of an unpardonable piece of ignorance, in that, in general, they know no difference between yellow orpiment, and the yellow fictitious arsenic, which they regularly sell under its name. The orpiment is known to be a safe internal medicine, and the thing they sell under its name is a very terrible poison. The colour-men, however, who sell both, are well acquainted with the difference.

The errors that have arisen from the confusion of names between orpiment and arsenic, have not been, even to this time, thoroughly set right; some accounting orpiment a poison, others an innocent medicine. It is certain that the smell of garlic, which orpiment emits, while burning, and its effects in turning copper white by its vapour, savour greatly of its containing arsenic, since they are qualities of that mineral; yet we have numerous accounts of its having been given with safety. The antients gave it internally, and ordered its fumes, while burning, to be received into the mouth in asthma's, and diseases of the lungs; and the Chinese, at this time, gave it a place among their cathartic medicines, after it has been burnt a little.

Among the modern writers on these subjects, Geoffroy declares it a corrosive and poisonous mineral, and tells us, that the symptoms it brings on are spasms of the head and feet, stupors, cold sweats, palpitations of the heart, swooning, thirst and heat, vomitings and tormina of the bowels, and, finally, death itself; he adds, that in bodies opened after death, brought on by this poison, the throat, stomach, and intestines have been found inflamed, eroded, and even perforated.

On the other hand, Boerhaave declares orpiment an innocent and harmless medicine: and Hoffman, who has been at more pains than any body to examine into its nature, declares the same; and even gives instances of its being given to dogs without any harm.

It is an excellent depilatory mixed with lime, and made into a paste with water. The painters are fond of it as a gold-colour; and a lixivium of it, with quick lime, makes sympathetic ink. See **INK**.

ORPINE, *anacampteros*, or *telephium*, in botany,

botany, is a species of sedum, with terminatory clusters of flowers. See the article SEDUM.

The leaves of orpine are accounted vulnerary and astringent; being chiefly used for erosions of the intestines in the dysentery.

Bastard ORPINE, *telephiastrum*, is also called by Linnæus *anacampteros*: it is a genus of the polyandria-monogynia class of plants, the flower of which consists of five roundish, concave, and patent petals: the fruit is a triangular and unilocular capsule, consisting of three valves, and containing a great many roundish seeds.

ORRERY, a curious machine, or movement, for representing the motions and appearances of the heavenly bodies. See plate CXCI. fig. 1.

The orrery, or planetarium, is fixed in a frame of ebony, contained by twelve vertical planes, on which are represented the twelve signs of the zodiac. The upper surface is flat, of polished brass, on whose outward circumference are screwed in twelve brass pillars, which support a large flat silvered ring marked 12, representing the ecliptic, with several circles drawn upon it. The three innermost are divided into twelve parts for the signs of the zodiac, each of which is divided into thirty degrees, and among these degrees are graved in their proper places, the nodes, aphelia, and greatest north and south latitudes of the planets. Between the next two circles are the cardinal points. The next three circles have the months and the days of the month, according to the new stile. Upon the brass-surface of the machine are graduated silver-circles, which carry the planets (represented by silver-balls) upon arbors or stems, that raise them up to the height of the plane of the ecliptic; and turning about the handle or winch of the orrery, all the planets move at their proportional distances from a little gilt ball in the middle, which represents the sun; and perform their revolutions according to their periodical times. There are fixed indices of blued steel, which shew the longitudes of the planets, by pointing to the divisions of the silvered rings or circles, as they move round. But as these circles, being concentric, give only the mean distances, the true orbits, according to their excentricities, are graved on the outside of each circle, with the periodical times taken from the tables, to

shew what the revolutions are, nearer than can be performed by any machine. The nodes and aphelia, with the places of greatest north and south latitudes, are also marked on those orbits. In the middle of this large circle, designed to represent the ecliptic, is fixed a globe, 1, to represent the sun. Next the sun is a small ball, 2, to represent mercury. Next to this is venus, 3, represented by a larger ball. And, at a greater distance from the sun, you see the earth, 4, represented by an ivory-ball, surrounded, at some distance, by a ring, which expresses the orbit of the moon, making an angle with the circle that represents the ecliptic, and thereby shewing the inclination they have to each other in the heavens, and also the line of the nodes. Within the same ring is another ivory-ball, 5, with a black cap or case, to represent the moon; the cap is contrived always to cover that hemisphere, which is turned from the sun, and thereby distinguish the enlightened part from the dark side, and consequently, her age, 6 represents mars. 7 is jupiter attended with his satellites, or four moons. And 8, the outmost of all the planets, is saturn with his ring or belt, and five satellites or moons. All these are fixed upon small stems, which severally represent their axes, each of which hath its peculiar and proper inclination to the plane of that circle which represents the ecliptic. 9 is a dial-plate; 10, 10, 10, meridians; 11, the equator; 12, the ecliptic with its circles, already described; 13, 13, two keys for locking and unlocking the diurnal and annual motions; and as to the arctic circle, tropic of cancer, and moveable horizon, they are named in the figure.

By means of the orrery, a great many persons, who have not time to apply themselves to the study of astronomy, and yet are desirous to be acquainted with the celestial appearances, in a few days may get a competent knowledge of several phænomena, and especially, be cured of the common prejudices against the motion of the earth, and the copernican system. See COPERNICAN.

But the principal use of the orrery is to render the theory of the earth and the moon easy and intelligible; and to evidence to our senses how all these appearances happen, which depend on the annual or diurnal rotation of the earth, and the monthly revolutions of the moon:

as the variety of seasons, the vicissitudes and various lengths of days and nights, the manner of solar and lunar eclipses, the various phases of the moon, &c. There have been various forms invented for this noble instrument, two of which have principally obtained, *viz.* the hemispherical orrery, and the whole sphere: though the orrery at first was made without any sphere, with only the sun, the earth, and moon revolving about it; but as this was too imperfect a state, they soon began to invest it, some with a half sphere, and others with a whole sphere, to be an adequate representation of the solar system.

The hemispherical orrery, as that above described, has been made in greater numbers than any other, on account of their being made much cheaper and easier than those in a sphere of the same size; there being a vast difference between placing an hemisphere on the box of an orrery, and disposing an orrery in a large moveable sphere. But the idea given us by the former, is very imperfect and unnatural in comparison of the latter, and it is surprising to think how they should have had so great a run. An orrery, therefore, adapted to an armillary sphere, is the only machine that can exhibit a just idea of the true system of the world, with the diurnal and annual motions of the heavenly bodies. It is likewise capable of exhibiting the third motion of the earth, *viz.* that motion of the earth by which the poles of the world revolve about the poles of the ecliptic, and occasions what is commonly called the precession of the equinoxes, or more properly the retrogression of the earth's nodes.

As the distances are in their true proportions to each other, so likewise are the bodies of the planets in their just proportions to one another. But it cannot be expected, that the diameters of the planets should be in proportion to the diameters of the orbits; because taking jupiter under three inches diameter, and the earth a little more than a quarter of an inch, it would require the system to be of the bigness of a mile and $\frac{3}{4}$, the orbit of saturn 9000 feet in diameter, and so on of the rest; which would make the machine 3000 times bigger than it is. And if the bodies were suited to the dimensions given, the bodies must be 3000 times less, which would render them all invisible, but the

sun; and that would be less than $\frac{1}{100}$ the part of an inch. For this reason, as a ball big enough to represent the sun cannot be put on, we are to suppose the sun (in respect of them) as big as the inner circle of the silver-ring, which represents the ecliptic.

As the orbit of the moon, and the orbits of the satellites of jupiter and saturn, are quite lost in this proportion of the orbits of the primary planets, much more are the satellites themselves; therefore the satellites are usually not put on in this position of the machine. But saturn's ring is joined to saturn's body, according to its proportion, and the inclination of its plane to the plane of saturn's orbit: and as the planet is carried round, the ring always moves parallel to itself, as it does in the heavens. Thereby we see why the inhabitants of the earth, in one revolution of saturn, see the ring twice in the most open situation of the ansæ, as at 8, and twice, as if it had no ring, that is, when the edge of the ring is towards the earth (the plane of the ring going thro' the observer's eye) and the successive increasing and decreasing of the visible bigness of the ansæ.

Jupiter, with his moons, is represented at 7, and the spots whereby his revolution has been observed.

When you have a complete idea of the proportional bigness of the planets, jupiter and saturn are taken off, and others put on three times less than the former, in order to put satellites about them (and at the same time the moon is joined to the earth) and shew how the satellites accompany their primary planet in its course round the sun. These satellites, which are pearls upon crooked stems, do not turn by clock-work round their primaries (as has been done in some large orreries) but are only set by the hand; because, to do it, would be only a needless expence, to give a false notion of their bigness, distances, and inclination of their orbits, in respect of their primaries. But to give a right notion of jupiter and his satellites, and of saturn and his satellites, there is shewn for each of these planets a system a-part, where the distances from the primary, and the bigness of the satellites, are expressed: and in this system, though jupiter is but of about an inch diameter, the outermost satellite is as far distant from jupiter's center, as saturn is from the sun in the machine; which shews the inconsistency and

and disproportion of making the satellites to move round jupiter in an orrery. Saturn's satellites are still more improperly put in; because four of them move in orbits very much inclined to saturn's ecliptic (*viz.* in an angle of above thirty degrees) and the fifth hath its orbit almost in the same plane as saturn's ecliptic, with a diameter greater than the diameter of the whole orrery, even when saturn is three times less than the saturn of the orrery.

The next thing which is put on, is a contrivance to shew, that all the confusion of the planets-motions in the ptolemaic hypothesis (called their stations and retrogradations) is not really, but apparently so, in the copernican or true system of the world. And this is done by two steel-indices, one of which being always applied to the sun, and successively to the top of the stem of the planet to be examined, whilst the other is applied to the earth (as a center) and the said planet: by turning the handle of the machine, the heliocentric and geocentric places of the planet are seen on the ecliptic at the same time; shewing why the planets seem to go backwards and forwards when viewed from the earth; tho' they go all the while regularly from west to east, as they would be seen from the sun.

When the machine is put in motion, all these bodies move round that which represents the sun, and, at the same time, both that, and all those which represent such of the planets as have been observed to have a rotation about their axis, turn round upon the said stems, and in their proper times. The satellites, or moons, also revolve about their primaries at the same time; and the ring that represents the orbit of the moon has likewise its proper motion, whereby that of its nodes is also expressed. The whole machine is put into motion by turning a small winch, 14, like the key of a clock, with very little strength. And, above this winch, is a cylindrical pin, which may be drawn a little out, or pushed in at pleasure: when it is pushed in, all the planets, both primary and secondary, will move according to their respective periods, by turning the handle or winch: when it is drawn out, the motions of the satellites of jupiter and saturn will be stopped, while all the rest move freely. In the place of the sun, you may fix a brass-lamp, with two convex-glasses,

made on purpose; which, being placed with the glass directly to the earth, and turning round in the same time with the earth, throws a continual strong light upon it and the moon, in whatever part of its orbit it is; and so not only the times in which the eclipses of the sun and moon will happen, are shewn, but the phaenomena themselves are truly represented.

When you propose to use this machine, place a small black patch, or a bit of wafer, upon the middle of the sun, right against the first degree of φ : you may also place patches upon venus, mars, and jupiter, right against some noted point in the ecliptic; put on the handle, and push in the pin which is just above it. One turn of this handle answers to a revolution of the ball, which represents the earth, about its axis; and, consequently, to 24 hours of time, as may be seen by the motion of the hour-index, 9, which is marked, and placed at the foot of the wire, on which the ball of the earth is fixed: again, when the index has moved the space of ten hours, jupiter makes one complete revolution round its axis; and so of the rest.

By these means the revolutions of the planets, and their motions round their own axes, will be represented to the eye. And it is worth observation, that the diurnal motion of the planets was discovered, by observing the motions of the spots upon the surface of the sun, and of the planets in the heavens, after the same manner as we here observe the motions of their representatives, by that of the marks placed upon them in this machine.

This machine is so contrived, that the winch may be turned either way; so that, the same number of revolutions being made backwards, they will bring all the planets to their former aspects or situations in respect to each other.

It would be too great an undertaking here to give an account of the mechanism of the larger sort of orreries, which represent the movements of all the heavenly bodies; nor, indeed, can it be done either by diagram or description, to render it intelligible to the most discerning reader; but, instead of that, we shall exhibit an idea of the theory and structure of an useful, concise, and portable planetarium, which any gentleman may have made for a small expence, and will exhibit, very justly, the motions of all the primary

mary planets about the sun, by wheel-work; and those that have secondaries, or moons, may have them placed about their primaries moveable by the hand, so that the whole shall be a just representation of the solar system, or true state of the heavens, for any given time of the year.

In order to this we must compare, and find out the proportion, which the periodical times, or revolutions of the primary planets, bear to that of the earth; and they are such as are expressed in the table below, where the first column is the time of the earth's period in days and decimal parts; the second, that of the planets; the third and fourth are numbers in the same proportion to each other: as,

365,25:88 ♄ :: 83:20, for merc.

365,25:224,7 ♀ :: 52:32, for venus.

365,25:686,9 ♂ :: 40:75, for mars.

365,25:4332,5 ♃ :: 7:83, for jupit.

365,25:10759,3 ♄ :: 5:148, for sat.

If we now suppose a spindle or arbor with six wheels fixed upon it in an horizontal position, having the number of teeth in each, corresponding to the numbers in the third column, *viz.* the wheel A M (*ibid.* fig. 2.) of 83 teeth, B L of 52, C K of 50 (for the earth), D I of 40, E H of 7, and F G of 5; and another set of wheels moving freely about an arbor, having the number of teeth in the fourth column, *viz.* A N of 20, B O of 32, C P of 50 (for the earth), D Q of 75, E R of 83, and F S of 148; then, if those two arbors of fixed and moveable wheels are made of the size, and fixed at the distance from each other, as here represented in the scheme, the teeth of the former will take those of the latter, and turn them very freely, when the machine is in motion.

These arbors, with their wheels, are to be placed in a box, of an adequate size, in a perpendicular position: the arbor of fixed wheels to move in pivots at the top and bottom of the box; and the arbor of moveable wheels to go through the top of the box, to a proper height, on the top of which is to be placed a round ball, gilt with gold, to represent the sun. On each of the moveable wheels is to be fixed a socket, or tube, ascending above the top of the box, and having on the top a wire fixed, and bent at a proper distance into a right angle upwards, bearing on the top a small round ball, representing its proper planets.

If then on the lower part of the arbor of fixed wheels be placed a pinion of screw-teeth, a winch turning a spindle with an endless screw, playing in the teeth of the arbor, will turn it with all its wheels; and these wheels will move the others about with their planets, in their proper and respective periods of time, very exactly. For, while the fixed wheel C K moves its equal C P once round, the wheel A M will move A N a little more than four times round, and so will nicely exhibit the motion of mercury; and the wheel F G will turn the wheel

F S about $\frac{1}{29,5}$ round, and so will truly

represent the motion of saturn: and the same is to be observed of all the rest.

ORRICE, the common name of the iris-root. See the article **IRIS**.

ORSA, a town of Lithuania, situated in 30° 40' east long. and 55° 30' north lat.

ORSOWA, a town of the bannat of Temeswaer, situated on the north side of the Danube, almost opposite to Belgrade.

ORSOY, a town of Westphalia, twenty miles south of Cleves.

ORTA, a town of St. Peter's Patrimony, thirty-five miles north of Rome.

ORTEGAL *castle and cape*, the most northerly promontory of Spain, thirty miles north-east of Ferrol: west long. 8° 22', north lat. 44°.

ORTEGIA, in botany, a genus of the triandria-monogynia class of plants, the calyx of which consists of five erect leaves; there is no corolla; the fruit is a roundish capsule, containing but one cell, in which are a great many very small, oblong seeds, acute on both sides.

ORTEIL, in fortification, the same with berme. See the article **BERME**.

ORTHODOX, in church-history, an appellation given to those who are found in all the articles of the christian faith.

ORTHOGONIAL, in geometry, the same with rectangled. See **RECTANGLED**.

ORTHOGRAPHIC *projection of the sphere*, that wherein the eye is supposed at an infinite distance; so called because the perpendiculars from any point of the sphere, will all fall in the common intersection of the sphere with the plane of the projection. See **PROJECTION** and **MAP**.

ORTHOGRAPHY, that part of grammar which teaches the nature and affections of letters, and the just method of spelling or writing words with all the proper and necessary letters, making one of the four greatest divisions or branches of

of grammar. See the articles GRAMMAR, LETTER, WORD, &c.

Orthography being, therefore, the doctrine of letters, treats principally of five heads, *viz.* 1. The number and division of letters. 2. Their accidents. 3. The just manner of writing letters, which, properly speaking, is orthography. 4. The pronounciation of letters. And, 5. The disposition of letters into syllables. See the article PRONUNCIATION, &c.

As to orthography, properly so called, or the right spelling of words, it must be learned from the best authors in each language. However, it ought to be observed, that orthography has appointed one way of spelling a word in common language, and another in the learned and polite diction: thus, in ordinary, we say, and write, *fancy, fantom, frenzy*, &c. for *phantasy, phantom, phrenzy*, &c. according to the original etymology of these words: and in such cases, as vulgarisms ought to be carefully avoided, so as not to write *obstropulus* for *obstreperous*, and the like; so, on the other hand, we must not alter the received orthography, in imitation of any one man, be his authority or learning ever so great; the general usage being, in this respect, the only rule that ought to be followed, since innovations rather confound than help the learner.

We shall therefore only add one observation more, with respect to the orthography of words, *viz.* that it ought, as much as possible, to be agreeable to the original etymology, sense, and pronounciation of words: thus it is better to write *phrenzy* than *frenzy*, on account of its being derived from the greek *φρεν*; in the same manner, the participle of the verb *singe* should be written *singeing*, on account of the sense, to distinguish it from *singing*; and, lastly, when letters are neither necessary on account of the etymology, sense, or sound, they ought to be rejected, as *public* for *publick*, the *k* being wholly superfluous.

As for that part of orthography which regards spelling, see SPELLING.

ORTHOGRAPHY, in geometry, the art of drawing or delineating the fore-right plan of any object, and of expressing the heights or elevations of each part. It is called orthography, from its determining things by perpendicular lines falling on the geometrical plane.

ORTHOGRAPHY, in architecture, the elevation of a building.

This orthography is either external or internal. The external orthography is taken for the delineation of an external face or front of a building; or, as it is by others defined, the model, platform, and delineation of the front of a house, that is contrived, and to be built, by the rules of geometry, according to which pattern the whole fabric is erected and finished. This delineation or platform exhibits the principal wall with its apertures, roof, ornaments, and every thing visible to an eye placed before the building. Internal orthography, which is also called a section, is a delineation or draught of a building, such as it would appear were the external wall removed.

To lay down the orthography of a building, draw a right line, for a base or grounding A B (pl. CLXXXIX. fig. 3.) and at one end erect a perpendicular A D; set off the width and distances of the gates, or doors, windows, &c. Upon A B and on the right line A D, set off the heights of the several parts visible in the face of the building, *v. g.* of the doors, windows, the roof, chimnies, &c. and apply a ruler to each point of division. The common intersections of the right lines drawn from the points parallel to the lines A B and A D, determine the external orthography of the building; and, after the same manner, is the internal orthography to be laid down.

ORTHOGRAPHY, in perspective, is the fore-right side of any plane, *i. e.* the side or plane that lies parallel to a straight line, that may be imagined to pass through the outward convex points of the eyes, continued to a convenient length.

Lamy and others use the word scenography in the same sense.

ORTHOGRAPHY, in fortification, is the profile or representation of a work; or a draught so conducted, as that the length, breadth, height, and thickness of the several parts are expressed, such as they would appear if perpendicularly cut from top to bottom. See FORTIFICATION.

ORTHOPNOEA, in medicine, a species or degree of asthma, where there is such a difficulty of respiration, that the patient is obliged to sit or stand upright, to be able to breathe. See ASTHMA.

ORTIVE, in astronomy, the same with eastern: the ortive or eastern amplitude, is an arch of the horizon intercepted between where a star rises, and the east point of the horizon, or point where the horizon and equator intersect.

ORTON,

ORTON, a market-town of Westmoreland, situated ten miles south-west of Appleby.

ORTYGOMETRA, **DAKER HEN**, in ornithology, a genus of birds, of the order of the scolopaces, the beak of which is shorter than the toes: it is of a compressed figure, and terminates in a kind of point; both the chaps are equal in length. There is but one species of this genus: it is of the size of our common magpye, and is a singular and elegant bird; the head is small and oblong; the eyes are large, and their iris reddish, the pupil is black; the head, neck, back, and tail are of a bright and elegant brown, variegated in a beautiful manner with spots of black; the throat is of a pale, whitish grey, as are also the breast and belly.

ORVALA, in botany, a genus of the didynamia-gymnospermia class of plants, the corolla of which consists of a single ringent petal; the tube is of the length of the cup; the limb is erect, long, and divided into four segments; there is no pericarpium; the seeds, being four in number, and kidney-shaped, are contained in the bottom of the cup.

ORVIETANUM, in pharmacy, the name of a celebrated antidote, so called, according to Lemery, from Orvietto, a city of Italy, where it was first used; but, according to others, from Hieronymus Ferrantes Orvietanus, a famous mountebank, who invented it.

The method of preparing this medicine may be seen in Lemery's Pharmacopée.

ORVIETTO, a city of Italy, in the pope's territories, capital of the province of Orvietto, situated at the confluence of the Tiber and the Chianè: east long. 13° , north lat. 43° .

ORWELL, a river of Suffolk, which, rising in the middle of that county, runs south-east, by Ipswich, and falls into the German sea, at Landguard-fort.

ORYZA, **RICE**, in botany, a genus of the hexandria-digynia class of plants, the corolla of which is formed of two obtuse, large, nearly equal, and permanent valves: the nectarium is composed of two leaves, plane, very small, and situated on the sides of the germen; the leaves of it are narrow at the base, truncated, and deciduous; there is no pericarpium; the corolla grows to the seed, and becomes of an oblong oval figure, compressed, thin at the edges, and marked each way with two lines on the sides; the seed is

single, large, obtuse, oblong, and compressed.

This plant is cultivated in vast abundance in the East, as also in Carolina, for food. It is said to be good in dysenteries, diarrhoeas, &c.

Rice, on importation, pays a duty of 6 s. $4\frac{6}{100}$ d. the hundred weight; and draws back, on exportation, 5 s. 9 d.

OS, in anatomy. See **BONE** and **MOUTH**. For the os calcis, os femoris, os frontis, os occipitis, &c. see **CALCIS OS**, &c.

Os SACRUM. See **SACRUM OS**.

OSACA, a great city and port-town of Japan, situated on the bay of the sea, on the east side of the island, in east long. 135° , north lat. 35° .

OSBECKIA, in botany, a genus of the octandria monogynia class of plants, the calyx of which is a single leafed, bell-shaped, permanent perianthium; the corolla consists of four roundish sessile petals, longer than the cup; the fruit is an oval capsule, covered with the truncated tube of the cup, containing four cells, in which are a great many roundish seeds: the receptacle is moon-shaped.

OSCHEOCELE, in surgery, a hernia of the scrotum. See the article **HERNIA**.

Of this rupture, sometimes called hernia scrotalis, there are two kinds; a true one, proceeding from a prolapsion of the intestine, or omentum; and a spurious one, or only apparent, arising from a tumour of the testicles, or spermatic vessels, or a distention with air, water, or some offending humour: the oscheocele is therefore distinguished into various kinds, according to the different substances with which the scrotum is distended, by which it is also differently denominated: when the intestine is prolapsed through the process of the peritonæum into the scrotum, the tumour is then called enterocele; if from the omentum, epiplocele; if from a distention with water, hydrocele; if from wind or flatus, pneumatoccele; when from blood, hæmatoccele; if the testicle is enlarged beyond its proper dimensions, it is termed sarcoccele; and when the spermatic veins are too much distended, it is termed varicoccele, cirsocele, or hernia varicosa; and when an abscess is formed in the scrotum, it is by some termed hernia humoralis; sometimes two or more of these substances concur together to form the tumour, which is then named conjunctly from them entero-epiplocele, hydro-enterocele, &c. each of these may be seen separately

parately treated of, under their several heads. See the articles ENTEROCELE, EPIPLOCELE, &c.

OSCHOPHORIA, in antiquity, an athenian festival, instituted by Theseus, in acknowledgement for his having destroyed the Minotaur, and thereby freed his country from the tribute of seven young men, who were to be sent every year into Crete, to be devoured by that monster.

At this festival there was always a race by young men elected out of every tribe, who run from Bacchus's temple to that of Minerva Sciras: the place where the race ended, was called Oschophorion, and the victor's reward was a cup containing a mixture of wine, honey, and oil.

OSCILLA, in antiquity, small images of wax or clay, which were made in the shape of men and women, and consecrated to Saturn, in order to render him propitious.

OSCILLATION, in mechanics, the vibration, or reciprocal ascent and descent of a pendulum. See **PENDULUM**.

It is demonstrated, that the time of a complete oscillation in a cycloid, is to the time in which a body would fall thro' the axis of that cycloid, as the circumference of a circle to its diameter; whence it follows, 1. That the oscillations in the cycloid are all performed in equal times, as being all in the same ratio to the time in which a body falls through the diameter of the generating circle. 2. As the middle part of the cycloid may be conceived to coincide with the generating circle, the time in a small arch of that circle will be nearly equal to the time in the cycloid: and hence the reason is evident, why the times in very little arches are equal.

3. The time of a complete oscillation in any little arch of a circle, is to the time in which a body would fall through half the radius; as the circumference of a circle, to its diameter; and since the latter time is half the time in which a body would fall through the whole diameter, or any chord; it follows, that the time of an oscillation in any little arch, is to the time in which a body would fall through its chord, as the semi-circle to the diameter. 4. The times of the oscillations in cycloids, or in small arches of circles, are in a subduplicate ratio of the lengths of the pendulums. 5. But if the bodies that oscillate be acted on by unequal accele-

rating forces, then the oscillation will be performed in times that are to one another in the ratio compounded of the direct subduplicate ratio of the lengths of the pendulums, and inverse subduplicate ratio of the accelerating forces. Hence it appears, that if oscillations of unequal pendulums are performed in the same time, the accelerating gravities of these pendulums must be as their lengths; and thus we conclude, that the force of gravity decreases, as you go towards the equator, since we find that the lengths of pendulums that vibrate seconds, are always less at a less distance from the equator. 6. The space described by a falling body in any given time, may be exactly known: for finding, by experiments, what pendulum oscillates in that time, the half of the pendulum will be to the space required, in the duplicate ratio of the diameter of a circle to the circumference.

Center of OSCILLATION. See **CENTER**.

OSCINES, among the Romans, an appellation given to such birds, from whose chattering or notes, omens and predictions were drawn; in which sense they stood contra-distinguished from the alites, or such birds as afforded matters for auguries by their flight. See **ALITES**.

OSCITATION. See **YAWNING**.

OSERA, a venetian island, in the gulph of Venice: east long. $15^{\circ} 30'$, north lat. 45° .

OSIMO, a town of Italy, in the territories of the pope, and marquisate of Ancona: fifteen miles north west of Loretto.

OSMERUS, in ichthyology, a genus of the malacopterygious class of fishes, the back and belly fins whereof are placed at the same distance from the head; the teeth are large and strong, and placed in both jaws, and also on the tongue and palate; the branchiostegemembrane on each side has seven or eight rays.

This genus comprehends the smelt and tarantola-fish. See the articles **SMELT** and **TARANTOLA FISH**.

OSMUNDA, in botany, a genus of the cryptogamia-filicum class of plants, of which no part of the fructification is visible, except the fruit; this is a globose, distinct capsule, many of which are arranged together in clusters, and which, when mature, open horizontally, and are found to contain a great number of very minute seeds of an ovated shape.

This genus comprehends the osmund-royal, and the moonwort.

OSNA.

OSNABURG, the capital of the bishopric of the same name, in the circle of Westphalia : east long. $7^{\circ} 40'$, north lat. $52^{\circ} 31'$. The territories of this bishopric, which are forty miles long, and thirty broad, are subject to its bishop : and this bishopric is alternately held by a protestant and papist, the protestant being always a prince of the house of Brunswic.

OSORNO, a town of Chili, in south America : west long. 80° , south lat. 41° .

OSPREY, *offifragus*, a bird of the falcon-kind, as big as a large cock, and more generally known by the names of haliaetus, and bald-buzzard. See the articles **HALIÆTUS** and **FALCO**.

OSSICLE, *officulum*, a little bone, a diminutive of bone, in which sense it is frequently used by anatomists.

Botanists also use *officulum* for the stone of a plumb, cherry, or any other stone-fruit.

OSSIFICATION, the formation of bones, but more particularly the conversion of parts naturally soft, to the hardness and consistence of bones.

Dr. Nisbet's opinion of ossification is, that in the blood, or a fluid secreted from it, there is an ossifying juice consisting of particles that are not apparent : that whenever nature designs an ossification between membranes, or within a cartilage, she occasions a more than usual afflux of this fluid, which so distends the vessels that were before invisible, as to make them capable of receiving the red globules of blood, which are always to be seen near the place where ossification is begun. In this blood, gritty bony particles are to be felt by the point of a knife, which have been formed by the attraction and cohesion of the particles of the ossifying juice obstructed, along with the other grosser fluids in the beginning of the vessels prepared to receive the reflux juices. The blood being capable of forming fine membranes, the membranaceous parts of a bone, which act as a gluten to keep these particles and fibres together, if there be any such, that do not arise from the coats of its vessels, are produced by a cohesion round the cretaceous particles of a part of the fluid, in which they were generated and contained. Thus the membranes of cartilages serve as a bed between, or within which the bony particles are deposited, or shoot ; but without any intermixture of the particles of the bone and cartilage, or continuation of the fibres of the one

substance to those of the other, as is evident in cartilages containing bones kept long enough in water, and then slit ; for the bone will, as soon as the large vessels that enter its substance are divided, slip as easily from it as an acorn does out of its cup : and there is a smoothness and polish of the parts of both cartilage and bone, which shew there is no conjunction of the fibres of the two substances. While the bones are increasing within cartilages, the cartilages are extended and spread out ; by which, with the pressure which they suffer, and the great influx of various fluids, and the nutritious matter being hindered from flowing freely into them, they decrease continually ; and, at last, may truly be said to be entirely destroyed.

For the formation of the bones of a foetus, see the article **FOETUS**.

OSSORY, the west division of Queen's County in Ireland.

OSSUNO, a town of Spain, in the province of Andalusia, forty miles east of Seville.

OSTAGIO, a town of Italy, in the territory of Genoa, fifteen miles north-west of Genoa.

OSTATRIC, a town of Spain, in the province of Catalonia, twenty-four miles north-east of Barcelona.

OSTEND, a city and port-town of the Austrian Netherlands, in the province of Flanders, situated twelve miles west of Bruges : east long. $2^{\circ} 45'$, north lat. $51^{\circ} 15'$.

OSTEOCOLLA, in natural history, tho' supposed by many to be an earth, is truly a crustated kind of spar, debased by earth, and therefore not transparent. See the article **SPAR**.

It is usually found coating over vegetable, or other bodies, in form of incrustations ; so that the true osteocolla is a tubular crustaceous spar, of a very foul and coarse texture, and carries with it much more of the appearance of a marl, than of a species of spar.

The masses of osteocolla, though regularly of the same figure, are very different in size ; some of them being not thicker than a crow-quill, and others of five and six inches diameter : it is always, however, of a tubular figure, and wrinkled and rough surface.

Osteocolla is frequent in Germany, where it is found buried near the surface of the earth, sometimes in strata of sand, but more frequently among marls : it should

be chosen for use, the purest that can be had of a pale brown colour, and of a tolerably close and firm texture.

It has long been famous for bringing on a callus in fractured bones; its name *osteocolla* signifying the bone-glue, or bone-binder. It is also recommended as a diuretic, and as good in the fluor albus; but, at present, little regard is paid to it; since, if it has any virtues, they must be wholly owing to spar, which may be given to greater advantage in a purer form.

OSTEOCOPOS, in medicine, any pain in the bones, whether arising from weariness, a sharp scorbutic humour, or a venereal taint. See PAIN.

OSTEOLOGY, that branch of anatomy which treats of the bones. See BONE.

The objects of osteology are the bones, whether they be recent or dried, whether they have belonged to an infant or an adult; and with the bones are to be considered their periosteum, medulla or marrow, the ligaments, and the cartilages. See the articles OSSIFICATION, MEDULLA, &c.

The study of the bones is to be considered in two lights; as theoretical, or as practical. In the first sense, osteology only extends to the external conformation and use of the bones: whereas in the latter or practical sense, it comprehends the more intimate knowledge of their interior structure and connections.

1. If their internal parts are the subjects of enquiry, they are to be cut or broken. 2. If the articulations are to be examined, the ligaments and cartilages, as well as the articulations themselves, must be dissected and carefully observed. 3. If the making a skeleton be the intent, then their preparation and preservation come into this branch. See the articles BONE, ARTICULATION, LIGAMENT, SKELETON, &c.

OSTEOSPERMUM, in botany, a genus of the syngenesia-polygamia-necessaria class of plants, the compound flower of which is radiated; the hermaphrodite corollulæ are numerous in the disc; the female ones are about ten in the radius; there is no other pericarpium but the cup; the hermaphrodite seeds are abortive; the female ones are solitary, globose, coloured, and at length indurated, including a nucleus; the receptacle is naked and plane.

OSTIA, a port-town of Italy, in the pope's territories, situated at the mouth

of the Tiber: east long. 13° , north lat. $41^{\circ} 30'$.

OSTIA, in anatomy, an appellation given to the orifices or apertures of the vessels of the body.

OSTIGLIA, a town of the dutchy of Mantua, fifteen miles east of Mantua.

OSTRACION, in ichthyology, a genus of the branchiostegious order of fishes, of a globose, oval, or ovato-quadrangular figure; the skin is always very firm and hard; and is in some species smooth, in others entirely covered with spines; and, finally, in some the spines entirely occupy only particular places: there are no belly-fins, and the others are five in number, viz. two pectoral or lateral fins, one on the back, the pinna ani, and the tail. To this genus belong the globe-fish, the horned triangular-fish, the porcupine-fish, sun-fish, &c.

OSTRACISM, *ostracismus*, in grecian antiquity, denotes the banishment of such persons whose merit and influence gave umbrage to the people of Athens, lest they should attempt any thing against the public liberty. It was so called, because the people voted a person's banishment, by writing his name on shells, called in greek *ostrakon*, and casting them into an urn.

OSTRACITES, in natural history, the name by which authors call the fossil oyster-shells. See the article OYSTER. Ostracites has the same medicinal virtues with the belemnites, and lapis judaicus, only in a higher degree; being accounted, by Dr. Lister, one of the greatest known medicines in nephritic cases: the dose, in powder, is from half a dram to a dram, in white wine; and to prevent a sickness at the stomach, that sometimes attends the taking it, one third part of the quantity of powdered chamamile-flowers may be mixed with it.

OSTRACITES is also a kind of cadmia. See the article CADMIA.

OSTRACODERMATA, in natural history, an appellation given to the testaceous shells; especially of the echini marini.

OSTREA, the OYSTER. See the article OYSTER.

OSTRICH, *struthio*, in ornithology, a distinct genus of birds, of the order of the gallinæ: it has only two toes to each foot; and these are both placed forward; and its head is simple, or not ornamented with the appendages which are common to most birds of this order.

The

The ostrich is the tallest of all the bird kind, measuring seven or eight feet when it stands erect: its legs are very long and naked; and the structure of the foot, having only two toes, is particular.

OSTROGOTSKOI, a city of Russia, in the province of Belgorod: east long. $40^{\circ} 30'$, north lat. $51^{\circ} 25'$.

OSTUNI, a bishop's see of the kingdom of Naples, eighteen miles north of Taranto.

OSWEGO, a town of the Iroquois, in North America, three hundred miles west of Albany, in New-York.

OSWESTRY, a market town in Shropshire, fifteen miles north-west of Shrewsbury.

OSYRIS, POET'S ROSEMARY, in botany, a genus of the dicecia-triandria class of plants, without any flower-petals: the fruit is a globose unilocular berry, containing a single osseous seed.

This whole shrub is astringent, and consequently good in fluxes.

Osyris is also a name sometimes used for the linaria, or toad-flax.

OTALGIA, the EAR-ACH. See EAR.

OTHONNA, BASTARD-JACOBÆA, in botany, a genus of the syngenesia-polygamia-necessaria class of plants, the compound flower of which is radiated, with a great number of tubulose and quinque-dentated hermaphrodite ones on the disc: the stamina are five very short capillary filaments; and the seed, which is single after each flower, is contained in the cup, and is either naked or crowned with down.

OTIS, the BUSTARD, in ornithology, makes a distinct genus of birds, of the order of the gallinæ, the characters of which are these: there are three toes on each foot, all turned forwards; and the head is naked, or has no comb.

The bustard has been confounded with the turkey: it is about the size of the common peacock, and runs at a prodigious rate, being frequently taken with greyhounds in a fair course, in the manner of hunting the hare: its flesh is well tasted.

OTLEY, a market-town, twenty-one miles west of York.

OTOQUE, an island situated in the bay of Panama, from whence this city is furnished with provisions: west long. 82° , north lat. 7° .

OTRANTO, a city and archbishop's see of the kingdom of Naples, situated at the entrance of the gulph of Venice:

east long. $19^{\circ} 15'$, north lat. $40^{\circ} 12'$.

OTRICOLI, a town of Italy, thirty-five miles north of Rome.

OTTER, *lutra*, in zoology, a genus of quadrupeds, of the order of the feræ, the characters of which are these: the fore-teeth in the upper-jaw are straight, distinct and acute; those of the under jaw are obtuse, and stand close together: the ears are situated lower than the eyes, and the feet are furnished each with five toes, and are palmated or formed for swimming.

Of this genus there are two species: 1.

The common otter, with all the toes of an equal length: this is a very fierce animal, three feet in length, including the tail.

2. The brasilian otter, with the inner toe shorter than the rest. This is somewhat larger than the former species.

OTTER-HUNTING. See HUNTING.

OTTER-PIKE, in ichthyology, a species of trachinus, with the under-jaw longest, and without any cirri, being otherwise called weaver. See TRACHINUS.

OTTOMAN, or OTHOMAN, an appellation given to the turkish empire, from Othomannus, or Osmanhus, the first emperor of the present family.

OTTONA, or ORTONA, a city of the kingdom of Naples, situated on the gulph of Venice, in east long. $15^{\circ} 30'$, north lat. $42^{\circ} 22'$.

OTUS, in ornithology, a name whereby some writers call the lesser horn-owl. See the articles STRIX and OWL.

OVA, EGGS, in physiology, architecture, &c. See the article EGG.

For the ova of women, see EGG, FALLOPIAN, GENERATION, and OVARIES.

OVAL, an oblong curvilinear figure, otherwise called ellipsis. See ELLIPSIS. However, the proper oval, or egg-shape, differs considerably from that of the ellipsis, being an irregular figure, narrower at one end than at the other; whereas the ellipsis, or mathematical oval, is equally broad at each end: though, it must be owned, these two are commonly confounded together; even geometers calling the oval a false ellipsis.

For oval columns and crowns, see the articles COLUMN and CROWN.

OVALE FORAMEN. See the articles FORAMEN and FOETUS.

OVARIES, in anatomy, called, by the earlier writers, testes muliebres, are two bodies of nearly an oval figure; but gibbous on the upper surface, and flat below:

low: they are of a whitish colour and smooth surface, and are annexed, one on each side, to the fundus of the womb. They are connected, 1. To the fundus uteri, by means of the ligamentum teres; 2. To the fallopian tubes, and the sides of the pelvis, by the ligamenta lata of the uterus, and the alæ vesperilionum; and 3. To many other parts by means of the spermatic vessels.

Their size differs, according to the age and temperament of the subject. They are largest in persons in the vigour of their age, and in such as are addicted to lust; in such subjects, they are found of two drams weight, and furnished with a number of prominent vesicles. In old people, they scarce weigh so much as half a dram, and are dry, corrugated, and deformed with cicatrices.

The ovaries are surrounded by a strong white membrane from the peritonæum, and are of a membranaceous substance, fibrous, reticulated, and full of vessels variously interwoven; among which are a number of round vesicles, with a yellow substance disposed under them: these are more or fewer in number, according to the age and temperament of the person; and are filled with a substance much resembling the white of an egg, which acquires also, on boiling, the hardness and consistence of a boiled egg. From this analogy with the eggs of birds, these vesicles were called, by Hornius, ova or ovula: the largest of them are hardly so big as a pea; but there are sometimes ten, sometimes fifteen, and at other times twenty, or more, in one ovary; though sometimes there are only one or two of them: these are supposed to contain the first rudiments of the foetus. See the article FOETUS.

OVATION, in the roman antiquity, a lesser triumph, allowed to commanders for victories won without the effusion of much blood; or for defeating a mean and inconsiderable enemy. The show generally began at the Albanian mountain, whence the general with his retinue, made his entry into the city on foot, with many flutes or pipes sounding in concert as he passed along, and wearing a garland of myrtle as a token of peace. The term ovation, according to Servius, is derived from *ovis*, sheep, because on this occasion the conqueror sacrificed a sheep, as in triumph he sacrificed a bull.

UDENARDE, a town of the Austrian Netherlands, in the province of Flanders, situated on the river Scheld, thirteen miles south of Ghent.

UDENBURG, a town of the Austrian Netherlands, in the province of Flanders, five miles south-east of Ostend.

OVEN, a kind of domestic furnace, used for baking bread, pies, tarts, &c. of a circular structure, with a very low roof, well lined, both on the top, bottom, and sides, with stone; it has a small entrance in the front, which is exactly fitted by a kind of door, which being clapped to the mouth of the oven confines the heat, while bread, pies or puddings are baking. Over this, pastery-cooks, &c. have another oven built much in the same manner, which is used for such things as require a less degree of heat. Ovens are heated by burning dry wood, faggots, &c. in them, till all the parts are equally hot.

Assaying-QVEN, in metallurgy, a particular kind of furnace, used by assayers in their operations upon metals.

The assaying-oven is constructed in the following manner: make with iron-plates a hollow quadrangular prism, eleven inches broad and nine inches high, (as in plate CLXXXIX. fig. 4.) ending at top in a hollow quadrangular pyramid, *bb cc*, of seven inches in height, terminating in an aperture at top seven inches square. At the bottom it must be closed with another iron-plate, which serves as a bottom to it: near the bottom make a door, *e*, three inches high and five broad, to lead to the ash-hole: above this door, and at the height of six inches from the basis, make another door *f*, of the figure of the segment of a circle: then fasten three long iron-plates on the fore-part of the furnace with rivets, one with its lower edge, as at *g g*, half an inch high; the second three inches high, as at *h h*; and the third, which is like the first, above the upper door at *i i*; and these plates are to be set on in such a manner as to form grooves: in order to shut both doors, you must adapt to each of them two sliders, *k k*, *ll*, made of iron-plates, to move within the abovementioned grooves, each of which should have a handle, but the two sliders belonging to the upper door, must have each a hole near the top; that is, one a small hole, a fifth of an inch broad, and an inch and a half long, as at *m*; and the other a semicircular aperture, one inch high and two inches broad,

broad, as at *n*: besides these, let five round holes, each of an inch in diameter, be bored in the furnace, two of which must be in the fore-part, as at *oo*; two in the back-part, opposite to the former; and all of them two inches and a half distant from each of the sides; and a fifth hole, *p*, must be made at the height of one inch above the upper edge of the upper door. The inside of the furnace must be lined throughout with iron hooks, standing out above half an inch, and placed at about three inches distance from each other, to hold on the matter of the lute, with which the whole inner surface is to be coated; let an iron, moveable, hollow, quadrangular pyramid, *q*, of three inches in height, be next adapted to the upper aperture of the furnace, so as to slide into the grooves *cc*; it must have two handles, as at *ss*, and be seven inches broad at the basis, and end upwards in a hollow tube, *r*, three inches in diameter, two inches high, and nearly cylindrical, but a little convergent at the top: this tube serves to support an iron-funnel or flue, *t*, which must be nearly cylindrical, hollow, and two feet long: this, when a very strong fire is required, must be put perpendicularly on the shorter tube, in such a manner that the latter enters about an inch and a half closely and evenly into it, and may be taken off at pleasure when the fire is not required to be so very violent: let a square ledge, made of a thick iron-plate, be fastened at the top of the upper edge of the lower door, which will conveniently support the grate and the lute; but this ledge must be made of two pieces, that it may be easily introduced into the cavity of the furnace. You must next place within the furnace small quadrangular iron-bars, half an inch thick, and fasten them edgeways on the extremities of the ledge, three quarters of an inch distant from each other. The inside of the furnace being then luted with windfor-loam, and dried by a gentle heat, will be fit for use.

The best fuel for this furnace is charcoal made of hard wood, and broken into pieces about an inch big, which must be introduced through the top of the furnace; and when an operation is performed, two iron-bars are to be put through the four holes above-mentioned, on which the muffle being introduced through the upper aperture, is placed in

such a manner, as that the open fore-side of it be contiguous to the inward border of the upper door.

OVER, in general, signifies one thing being above another; through, or from, one end to another; beyond, cross, or overthwart: it also denotes excess, &c. thus,

OVER-BLOW, among seamen, is when the winds blow so very hard, that the ship can bear no topsails.

OVER-DONE, in the manege: a horse is said to be over-done when his wind and strength are broke and exhausted with fatigue.

OVER-FLOWING of lands, among husbandmen, is commonly effected by diverting the streams of rivers, brooks, land-floods, or springs, or some part of them, out of their natural channel: but where streams lie too low for this, they are made use of to turn such engines as may raise a sufficient quantity of water to do it. The most useful engine for this purpose is the persian wheel. See the article **PERSIAN WHEEL**.

Where there are no streams to turn this wheel, the farmers have recourse to pumps and other engines moved by the wind. Lands that lie low, near brooks, give more frequent opportunities for these practices than those which are near rivers; the brooks having greater falls, and the rivers running more flow and level; but when it can be effected by the waters of large rivers, the land is yet more enriched by it; these waters being much more fruitful than the others. When the water is by this engine thrown into the trough, it is to be conducted by it to the highest part of the land; and when that is sufficiently flooded, the water is to be let into a large but not deep trench; several small ones running out of which to all parts of the land, may convey it every where, and every part may be enriched by it. It is always proper to contrive this matter so, that the overflowing may be often repeated, and the water quickly carried off: for when it is suffered to be long upon the land in winter, it is apt to breed rushes, and other coarse plants, upon the ground. All waters are not proper for this purpose of overflowing of lands to enrich them: the waters of coal-mines, and other places where there is only sulphureous minerals mixed among them, being apt to destroy and kill the grass wherever they come. Land-floods are the best to overflow with
in

in winter, and warm fattening springs in summer. It must be observed, that the water of one operation is dried, before any more is let on. It is always best also to do it at night, that the moisture may be soaked into the ground before the heat of the day. The washings of towns, and of public highways, is a great improvement to lands; as is also the washings of lands where sheep feed. Cold clay lands, and other strong lands that lie flat will only be improved by overflowing them with land-floods, and that only in summer.

OVER-GROWN, on board a ship. When the waves of the sea grow high, the mariners call it rough-sea; but when the surges and billows grow higher, then it is an over-grown sea.

OVER-HALE, in the sea-language. A rope is said to be overhauled when drawn too stiff, or haled the contrary way.

OVER-HALE *the runner*. See **RUNNER**.

OVER-RAKE, among seamen: when a ship, riding at anchor, so overbeats herself into an head-sea, that she is washed by the waves breaking in upon her, they say the waves over-rake her.

OVER-REACH, in the manege, is when a horse strikes his hind-feet against his fore. The word is also used for a strain or painful swelling of the master-sinew of an horse, occasioned by such over-reach.

OVER-RIDING, in the manege, the same with over-done, *supra*.

OVER RULING *an objection*, in law, is the rejecting or setting it aside by the court.

OVER-RUNNING, among printers. See the article **PRINTING**.

OVERSEERS *of the poor*, are public officers appointed by statute in every parish, to provide for the poor therein; and sometimes they are two, three, or four, according to the largeness of parishes. See the article **POOR**.

OVERSET, or **OVERTHROW**, in the sea-language. A ship is said to overset, when her keel turns uppermost; which misfortune is occasioned either by bearing too much sail, or by grounding her so that she fails upon one side.

OVERFLACKEE, an island of the united Netherlands, in the province of Holland, situated in the mouth of the river Maes, having the island of Voorn on the north, Brabant on the east, the island of Schowen on the south, and the Goree on the west.

OVERT, the same with open: thus an overt-act signifies an act which, in law,

must be clearly proved; and such is to be alledged in every indictment for high treason.

OVERTURE, or **OVERTURE**, opening or preluding; a term used for the solemnities at the beginning of a public act or ceremony; an opera, tragedy, concert of music, &c.

The overture of the theatre, or scene, is a piece of music usually ending with a fugue: the overture of a jubilee is a general procession, &c.

OVERYSCHÉ, a town of the Austrian Netherlands, in the province of Brabant, situated on the river Ysche, nine miles north-east of Brussels.

OVERYSSEL, one of the United Provinces, bounded by Groningen on the north, by Westphalia on the east, by Zutphen on the south, and by Guelderland, the Zuyder-sea, and Friesland on the west.

OVICULUM, in the antient architecture, a little ovum, or egg: some also use the word oviculum for ovolo. See **OVOLO**.

OVIDEA, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof is a ringent single petal; the tube of the corolla is very long and small; the upper lip is concave and emarginated; the lower one is divided into three equal segments: the fruit is a globose berry, containing two roundish seeds.

OVIÉDO, a city of Spain, capital of the province of Asturias: situated on the river Asta, fifty miles north of Leon, in west long. 6° 40', north lat. 43° 30'.

OVILIA, or **SEPTA**, in antient Rome, a place in the campus martius, at first railed in like a sheep-pen, whence its name. Afterwards it was mounted with marble, and beautified with walks and galleries, as also with a tribunal, or seat of justice. Within this precinct, or enclosure, the people were called in to give their suffrages for the election of magistrates. The ascent into the ovilia was not by stairs, but by pontes, or narrow boards, laid there for the occasion; on which account *de ponte dejici* was to be denied the privilege of voting; and persons thus dealt with, were called deponenti.

OVIPAROUS, a term applied to such animals as bring forth their young, *ab ovo*, from eggs; as birds, insects, &c. See the article **EGG**.

The oviparous kind stand in opposition to those which bring forth their young alive, called viviparous animals, as man,

man, quadrupeds, &c. Oviparous animals may be said to be such as conceive eggs which they afterwards bring forth, and from which, by the incubation of the parent, or some other principle of warmth and fermentation, at length arise animals; which, after they have spent the moisture or humour they have been surrounded withal, and are grown to a sufficient bulk, firmness and strength, break their shell and come forth. The oviparous kind, besides birds, include divers other species of terrestrial animals.

OVIS, the SHEEP, in zoology. See the article SHEEP.

OULNEY, a market-town of Buckinghamshire, situated nine miles south-east of Northampton.

OULZ, a town of Italy, in the province of Piedmont; situated in east long. $6^{\circ} 30'$, north lat. 45° .

OUNCE, *uncia*, a little weight, the sixteenth part of a pound-avoirdupois, and the twelfth part of a pound-troy: the ounce-avoirdupois is divided into eight drams; and the ounce-troy into twenty penny-weights. See WEIGHT.

OUNCE, *lynx*, in zoology. See the article LYNX.

OUNDLE, a market-town of Northamptonshire, situated on the river Nen, twenty-two miles north-east of Northampton.

OVOLO, or OVUM, in architecture, a round moulding, whose profile, or sweep, in the ionic and composite capitals, is usually a quadrant of a circle: whence it is also commonly called the quarter round. It was usually enriched with sculpture by the ancients, in the form of chesnut-shells; whence Vitruvius, and others, called it echinus, *i. e.* chesnut-shell. See the article MOULDING.

Among us, it is usually cut with the representation of eggs and anchors, or arrows-heads placed alternately.

OURAN, the name of an imaginary sect of magicians, in the island of Grombocanore, in the East-Indies; where they are supposed to have the art of rendering themselves invisible, and passing where they please, and by these means doing infinite mischief.

OUROLOGY, in medicine, a name given by authors to a treatise or discourse on the subject of urine. See the article URINE.

OUSE, a river, which rising in the north of Yorkshire, runs south-east by York;

and, continuing that course, falls into the Trent.

OUSE is also a river which rises on the confines of Oxfordshire and Buckinghamshire, and running north-east through Buckinghamshire, Bedfordshire, Huntingdonshire, Cambridgeshire, and Norfolk, passes by Buckingham, Bedford, Huntingdon, and Ely, discharging itself into the bay of the German sea at Lynn.

OUSTED, in our old law-books, the being removed or put out of possession.

OUSTER LE MAIN, a writ antiently granted and directed to the escheator, on a petition for the same purpose, to deliver seisin out of the king's hand to the party who sued out the writ, because the lands seised were not held of the king; or that he ought not to have the wardship of them, &c. It is likewise taken to be the judgment given in a *monstrans de droit*: but all ouster le mains, wardships, liveries, &c. are now taken away.

OUSTER LE MER, in law, signifies a cause of excuse given to the court on a defendant's not appearing upon summons, by alledging that he was then beyond the seas.

OUSTIACH, or OSTIACH country, is a part of Asiatic Russia, extending along the river Irtis to its confluence with the river Oby, and from thence northward along the banks of the Oby and Jenisa, into the gulph of the Manga-sea, or the frozen ocean; and extending also along the banks of several rivers which fall into the Oby and Jenisa.

OUTFANGTHEF is taken for an antient privilege of the lord, when a felon, dwelling in his manor, was taken out of his see; in which case, he might cause him to be brought back to judgment in his own court.

OUT-HOUSES are such as belong and are adjoining to dwelling-houses.

OUT-LAND, among the Saxons, was that land which lay beyond the demesnes, and was granted out to tenants; though at the will of the lord, in like manner as copyhold estates.

OUT-LAW, signifies one that is deprived of the benefit of the law, and therefore held to be out of the king's protection. See the next article.

Where an original writ, and the writs of *capias*, *alias*, and *pluries*, have been issued against a person, and are returned by the sheriff, *non est inventus*, and after proclamation made for him to appear,

&c. if he omits so doing, he then becomes out-lawed: though, formerly, no person could be out-lawed, except in the case of felony; which being punishable by death, any person was at liberty to slay the out-law; but that is now altered, and no person but the sheriff, on a lawful warrant, may put a person out-lawed for felony to death. An infant under age, or a woman who is never sworn to allegiance, cannot be an out-law, though the latter is said to be waived. See the article WAIVE.

OUTLAWRY, is where a person is out-lawed, and on that account loses the benefit of a subject. See the preceding article.

The process of outlawry lies in indictments of treason or felony, and also of trespass vi. & armis, conspiracy, &c. And by statute, persons may be out-lawed in many civil actions, as debt, case, covenant, &c. On an outlawry for felony the person forfeits his lands, goods, and chattels; in personal actions, the goods and chattels of the person are only liable, and they are forfeited to the king, with the profits of his chattels real, by a necessary consequence, that the party being extra legem, is therefore incapable to take them himself. In the case of either treason or felony, an outlawry may be reversed by writ of error, or plea; and the judgment upon the reversal is, that the party shall be restored to all that he lost, &c. however, he must plead to the indictment against him. If a party outlawed in a civil cause, does come in gratis, on the return of the exigent, alias, or pluries, he may, by motion, reverse the outlawry, without putting in of bail: but in case he comes in upon a cepi corpus, he shall not be permitted to do it, unless he appear in person, or give bail to the sheriff for his appearance on the return of the cepi. When an outlawry is after judgment, it cannot be reversed, till satisfaction is acknowledged of record by the plaintiff, or the defendant has brought the money recovered into court: and on reversal of an outlawry, the plaintiff may declare against the defendant for the same matter, in two terms, on a new original, and in another county, besides that where in the action was first laid.

OUTLICKER, in a ship, a small piece of timber made fast to the top of the poop, and standing out right a-stern. At the outmost end thereof is a hole, into which the standing part of the sheet is reeved,

through the block of the sheet; and then again through another block, which is seized close by the end of this outlicker. It is seldom used in great ships, except the mizen-mast is placed so far aft, that there is not room within-board to hale the sheet flat.

OUT-RIDERS, certain bailiffs-errant, that are employed by sheriffs, to ride to the farthestmost parts of counties, or hundreds, in order to summon people more speedily to county courts, &c.

OUTWARD flanking angle, or *The angle of the tenaille*, in fortification, is comprehended by the two flanking lines of defence.

OUTWORKS, in fortification, all those works made without-side the ditch of a fortified place, to cover and defend it.

Outworks, called also advanced and detached works, are those which not only serve to cover the body of the place, but also to keep the enemy at a distance, and prevent his taking advantage of the cavities and elevations usually found in the places about the counterscarp, which might serve them either as lodgments, or as rideaux, to facilitate the carrying on their trenches, and planting their batteries against the place: such are ravelines, tenailles, hornworks, queue-d'arondes, envelopes, crown-works, &c. See the article RAVELIN, TENAILLE, &c.

It is a general rule in all outworks, that if there be several of them, one before another, to cover one and the same tenaille of a place, the nearer ones must gradually, one after another, command those that are farther advanced out into the champaign, that is, must have higher ramparts, that so they may overlook and fire upon the besiegers, when they are masters of the more outward works.

OVERTURE. See OVERTURE.

OVUM PHILOSOPHICUM, or **CHEMICUM**, a glass-body, of an oval form, resembling an egg, used for the sublimation of mercury. See MERCURY.

OUZEL, or the *Water OUZEL*, in ornithology, the motacilla, with a black body and white breast. See MOTACILLA.

OWELTY, or **OVELTY** of services, in our law-books, denotes an equality of services; as in the case of a lord-mesne, and a tenant who holds the mesne, as he holds of the superior lord.

OWL, in ornithology, the english name of several species of the strix. See STRIX. The several species of strix, that fall under this denomination, are very numerous.

merous. 1. For the great horn-owl, or eagle-owl, see the article BUBO.

2. The black and white horn-owl, or the white aurited strix, is a beautiful bird, equal to a turkey in size, of a snow-white colour, elegantly variegated with spots and lines of black; the head is large, round, short, and decorated in a very beautiful manner, with a pair of ears or horns, as they are usually called, being tufts of erect feathers, having their origin from the verges of the apertures of the ears. 3. The lesser horn-owl, being the strix with the head aurited with six feathers, is another very beautiful bird, equal to a large pigeon in size, with very large wings; the wings are reddish, as is also the lower part of the belly and back. 4. The grey-owl, or the brown strix, with a smooth head, with black eyes, and the primary wing-feathers serrated. 5. The yellow owl, with a smooth head. 6. The hazel-owl, or the brown strix, with a smooth head, and the eyes brown. 7. The yellow-eyed owl, or the brown smooth-headed strix, with the iris of the eyes yellow. 8. The variegated tailed owl, or the brown smooth-headed strix, spotted with white, and with white fasciæ on the tail. 9. The little owl, or the brown strix, with a smooth head, and five series of spots on the wing feathers. This is an extremely pretty little bird, and so small, that it appears singular to see the marks of this genus on it. It is about the bigness of the black-bird, and its wings are very long. 10. The white-owl, or the white strix, with a smooth head, being nearly equal to a goose in bigness. 11. The common brown-owl, or jay-owl, being the brown smooth-headed strix, with the third of the wing-feathers longest, and about the size of a pigeon. 12. The german horn-owl, or the horn-owl with a long tail. 13. The church-owl, or the lesser horn-owl, being the variegated-backed, smooth-headed strix. 14. The white-beaked owl, or the smooth-headed strix, with a bluish, grey back, and a whitish beak. And, 16. The yellow-beaked american owl, or the yellow-beaked strix, with a brown body, variegated with white.

OWLER, any person who conveys wool, &c. to the sea-side in the night time, there to be shipped, contrary to law.

OWSE, among tanners, oaken bark beaten or ground small, to serve in the preparation of leather.

OX, *bos*, in zoology, makes a genus of quadrupeds. See the article BOS.

The common ox is too well known to need a particular description: the bull is a very heavy, but at the same time a stately and fierce-looking animal, with wide nostrils, large eyes, and long and patulous ears; his forehead is decorated with short curled hair, and the skin hangs loose under his throat: for the properties of a bull, kept for breeding, see the article BULL.

When these creatures are intended to breed, the better the land is, the larger sort of beasts is to be chosen, and the greater will be the profit. But of whatever sort the breed is, the bull should always be of the same country with the cow, otherwise it never succeeds so well. See the article COW.

The largest oxen are to be chosen for work, and for feeding, but then it must be where there is land rich enough to maintain them. When they are to draw, care must be taken to match them well, both for height and strength; for if one be stronger than the other, the weakest will soon be destroyed. They must never be driven beyond their natural pace, for the beating them throws them into surfeits; and many other diseases. The time of putting oxen to work is at three years old; they must be worked gently the first year, especially in hot weather, and fed with a large quantity of hay: this will enable them to bear their labour better than grass; and they should be always kept in a middle state, neither too fat nor too lean. They may be worked till they are ten or twelve years old, and then sold.

Diseases of OXEN. As scarce any creature is more useful to man than the ox kind, nothing is more worthy consideration than the nature and origin of their diseases, and the remedies for them. The same distemper that has of late years carried off such vast numbers of these cattle with us and elsewhere, has at other times raged in Italy. In the year 1710, and the succeeding one, there was a great mortality among the horned cattle there, and the occasion of it was evidently the unnatural season preceding. The whole autumn before had been wet, and at the time of the winter solstice there were continual cold winds, and small, but lasting rains. The spring that succeeded was also cold and rainy, and the defect of heat, and abundance of moisture, made

a change in the whole face of nature: the medicinal springs had not their wonted effect; and the fruits of the earth could not appear at their proper seasons, nor in their due perfection. The grass was injured by this, and the ground rendered continually damp and unwholesome: and to this was evidently owing the malignant and contagious disease that raged among the cattle afterwards. It was supposed at that time with them, as of late with us and elsewhere, that the contagion was brought in among their oxen by strange cattle coming from infected places, but this proved to be an error; for if an ox was removed to ever so distant a pasture, he never escaped the better for it: the whole earth and its productions were vitiated throughout the country, and there was no safety in any part of it.

The use of this observation must be, the keeping the cattle in succeeding years out of the way of those things which occasion their sicknesses in such as these. If the autumn or winter be extremely cold and wet, remove the cattle out of the low grounds, and put them to feed in sandy, dry soils, on the high grounds; give them water from such places where the sun has most power, and it is less chilling cold than in others; and in cases of imminent danger, always mix some salt in it. If the bad weather continues, let them always have clean straw to lie on, and a dry covering; and in cases where the contagion is already begun, the fumigating the houses where they are kept with bay leaves and eleutherian bark, is judged convenient. As to remedies, when they are once seized with the distemper, it is hard to understand what intention to prescribe in, and how to ascertain the doses; and as the late practice, in attempting to cure, has been of very little service, the cautions for preventing the disease ought to be redoubled, to avoid an almost incurable misfortune.

OXALIS, or **Oxys**, **WOOD SORREL**.
See the article *Wood SORREL*.

OXFILD, in our old writers, is said to be a restitution made by a county, &c. for any wrong done in the same. See the article **HUE** and **CRY**.

OXFORD, the capital city of Oxfordshire, and the see of a bishop; it is situated at the confluence of the Isis and Cherwell, fifty-five miles west of London: west long. $1^{\circ} 15'$, and north lat. $51^{\circ} 45'$.

Oxford is most remarkable on account

of its university, which consists of twenty colleges and five halls: this city sends two members to parliament, and the university as many.

OXGANG, or **OXGATE**, is generally taken, in our old law-books, for fifteen acres, or as much ground as a single ox can plough in a year.

OXUCIÆ, in natural history, the name of a genus of fossils of the class of the selenitæ, but of the columnar, not the rhomboidal kind. The selenitæ of this genus consist of six equal planes, having their top or bottom no broader or more depressed than the others; and in this differing from the ischnambluces, or flatted columnar selenitæ, as they do from the isambluces or crystaliform, but broken ended ones, by having their ends naturally tapering off to a point. The bodies of this genus, like those of the other genera of the columnar selenitæ, are liable to a longitudinal crack in their middle; and this sometimes includes a little clay, in form of an ear of grass. See the article **SELENITÆ**.

Of this genus there are only two known species. 1. A fine kind, with thin flakes and transverse filaments, found in the clayey banks of the river Nen, near Peterborough, in Northamptonshire; and, 2. A dull kind, with thick plates and longitudinal filaments. This is not uncommon in Yorkshire, and lies sometimes in a yellow, sometimes in a blue clay.

OXUS, a river which rises in the mountains on the north of India, and running north-west, through Usbec Tartary, afterwards separates Persia from Usbec Tartary, and falls into the Caspian sea, in 44° north latitude.

XYCOCCUS, in botany, a species of vaccinium. See **VACCINIUM**.

XYCRATE, *oxycratum*, in pharmacy, &c. a mixture of vinegar and water, proper to assuage, cool, and refresh; they make fomentations of oxycrate, clysters of oxycrate, &c. The usual proportion is one spoonful of vinegar to five or six spoonfuls of water.

XYCROCEUM, in pharmacy, &c. a preparation much used in plasters for fractures, &c. made as follows: take yellow wax, one pound; pitch and galbanum, each half a pound: melt them over a gentle fire; and then add of venice-turpentine, myrrh, and olibanum, each three ounces; saffron, two ounces: make them into a plaster.

XYGLY-

OXYGLYCU, a species of drink prepared of the sweetest honey-combs, macerated and boiled. The combs from which all the honey has been expressed, are put into a pot with pure water, and boiled till they seem to have deposited all their contained honey in the water. This liquor is to be kept, and, when diluted with cold water, is to be drank in the summer-time, in order to remove thirst.

OXYMEL, in pharmacy, a composition of vinegar and honey.

There are several sorts of oxymel, whereof the simple kind is made by boiling, in a glazed earthen-vessel, and with a gentle fire, two pounds of clarified honey, in a pint of vinegar, to the consistence of a syrup.

The chief compound oxymels, are oxymel of garlic, and oxymel of squills.

Oxymel of garlic is thus made: take of garlic, sliced, an ounce and an half; caraway-seeds, and sweet-fennel-seeds, of each two drams; of clarified honey, ten ounces; of vinegar, half a pint: boil the vinegar a little while in a glazed earthen-vessel, with the seeds bruised; then add the garlic, and cover the vessel; after all is cold, press out the liquor; and, with the heat of a balneum, dissolve in it the honey.

Oxymel of squills is made by boiling three pounds of clarified honey in a quart of vinegar of squills, over a gentle fire, to the consistence of a syrup.

In all the oxymels, a metalline vessel must be avoided, lest it should be corroded by the vinegar.

OXYRRHODIUM, in pharmacy, a compound medicine, made of four or five parts of oil of roses, and one of vinegar.

It is used in inflammations, and to dry up tetter.

OXYSACCHARUM, a liquid medicine prepared of sugar and vinegar.

OYER, in law-books, seems to have been antiently used for what is now called assise. See the article **ASSISE**.

OYER AND TERMINER, a commission directed to the judge of assise, and other gentlemen, empowering them to hear and determine all criminal causes, and to try all offenders, whether for treason, felony, or trespass.

On the general commission of oyer and terminer, there goes a precept to the sheriff, in the name of the justices, bearing date fifteen days before their sessions, in

order to return twenty-four persons, for a grand-jury, on such a day. See **JURY**. These justices have power to proceed only upon indictments that are brought before them, unless they have likewise a commission of gaol-delivery, or a special one; which, it is said, may be granted to enquire of oppressions and extortions of under-sheriffs, bailiffs, clerks of the market, and all other officers, on the complaint of any one who will sue out the same.

OYER of a deed, a petition to hear and peruse any deed, upon which an action is brought. This is always granted the defendant, who may also take a copy of it, that he may consider what to plead to the action. It is held, that where executors bring an action of debt, the defendant may crave oyer of the will.

There is also oyer of a record, wherein the plaintiff or defendant moves the court, that they will hear or look upon a record.

OYES, or **OYEZ**, signifies *hear ye*; and is frequently used by the cryers in our courts, on making proclamations, or to enjoin silence.

OYSTER, or **OISTER**, *ostrea*, in zoology, a genus of bivalve shell-fish, the lower valve of which is hollowed on the inside, and gibbose without; the upper one is more flat; and both are composed of a multitude of laminæ or crusts, and usually scabrous or rough on the outer surface: some oyster-shells are also furnished with tubercles, or spines, and others are deeply furrowed and plicated: the figure of most is roundish, but in some it is quite irregular.

Oyster-shells are accounted drying and abstergent, and given internally, sudorific.

OZÆNA, *ozæna*, in surgery, a foul and malignant ulcer of the nose, distinguished by its foetor, and often accompanied with a caries of the bones of the nose.

An ozæna generally proceeds from a foulness of the blood, and especially when it is affected with the scurvy or venereal disease; tho' sometimes it proceeds from acrimonious or caustic substances drawn into the nose along with the breath.

As to the cure, such medicines should be used, as serve to correct the blood, and rectify the depraved habit of body; of which mercurials, and decoctions of the woods, are the chief; and in the mean time the patient's diet should be spare and light,

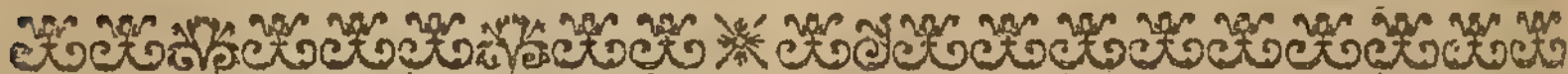
light, and without seasoning; and, when owing to a venereal cause, nothing proves so effectual as a salivation.

Externally, such topical medicines must be applied as serve to deterge ulcers, as the aqua virid. Hartmanni, applied with tents or linen-rags rolled up. A mixture of lime-water with mercurius dulcis may be likewise used with success. You will also find great benefit in the worst kind of the disorder, from a decoction of savin and scordium, in a pound of which must be dissolved an ounce of the unguent. fusc. Wurtz. used warm; or an injection of spirit of wine, in which is dissolved some honey of roses and mercurial ointment. Some use an injection of oil of sweet almonds, an ounce, with a dram of oil of castor, to soften the acrimony of the humours; others, again recommend tobacco-leaves, or tobacco-ointment; and others use precipitate, mixed with an emollient ointment, and applied with tents: if the pain be great, they add to these medicines, a scruple of camphor and saffron, with half a scruple of opium. Lastly, fumigating with cinnabar is recommended; in the use of which medicines, the patient must continue, at least, till the stench and discharge of corrupt matter cease. When the matter is well digested, the running abated, and the pain

gone, the ulcer may be cicatrized with lotions, and washed with warm milk. If it gathers to a crust, it may be removed by oil of sweet almonds, or by a powder made of rosemary and lavender-flowers, dried-lemon-peel, and common snuff.

When the ozæna is accompanied with a caries, it is hardly curable, before a separation of the carious bone is obtained, which may sometimes be effected by pliers, or a pair of scissars.

Sometimes the ozæna is situated in the sinus of the upper jaw; in which case Dr. Drake advises to extract one of the dentes molares, and then to open a passage through the alveolus or socket, into the sinus, by a probe or other sharp-pointed instrument: by this opening the offending matter may not only be discharged, but you may throw in proper injections, composed of elixir-proprietatis, or tincture of myrrh and aloes, either alone, or mixed with a decoction of savin and scordium, with some honey of roses; which must be retained in the sinus for some time, by stopping up the passage: then, after the injection is discharged, a tent, tied to a thread, is to be inserted, to prevent the passage from closing up, before the ulcer is thoroughly deterged; after which, the cure may be completed with balsamics.



P.

P or p, the fifteenth letter, and eleventh consonant of the alphabet; the sound of which is formed by expressing the breath somewhat more suddenly than in forming the sound of b: in other respects, these two sounds are very much alike, and are often confounded one with another. When *p* stands before *t* or *f*, its sound is lost, as in the words *psalms*, *psychology*, *ptolemaic*, *ptisan*, &c. when placed before *b*, they both together have the sound of *f*, as in *philosophy*, *physic*, &c.

As an abbreviature, *P* stands for *Publius*, *pondo*, &c. *PA. DIG.* for *patricia dignatis*; *P. C.* for *patres conscripti*; *P. F.* for *Publii filius*; *P. P.* for *propositum*, or *propositum publice*; *P.*

R. for *populus romanus*; *PR. S.* for *prætoris sententia*; and *PRS. P.* for *præses provinciæ*.

In the Italian music, *P.* stands for *piano*, or softly; *PP.* for *piu piano*, *i. e.* more softly; and *PPP.* for *pianissimo*, or very softly.

Among astronomers, *P. M.* is used to denote *post meridiem*, or afternoon; and sometimes for *post mane*, *i. e.* after midnight.

As a numeral, *P.* signifies the same as *G. viz.* 400; and with a dash over it, thus *P̄*, 400,000.

Among physicians, *P.* denotes *pugil*, or the eight part of an handful; *P. Æ.* *partes æquales*, or equal parts of the ingredients; *P. P.* signifies *pulvis patrum*, *i. e.*

i. e. the jesuits powder; and ppt. præparatus, prepared.

PABULUM, FUEL, among natural philosophers and chemists. See the articles FUEL and FIRE.

PACALIA, a festival observed by the Romans, in honour of the goddess Pax, or Peace.

PACAMORES, a province of Peru, on the confines of Amazonia.

PACE, *passus*, a measure taken from the space between the two feet of a man, in walking; usually reckoned two feet and an half, and in some men a yard or three feet. See the article MEASURE.

The geometrical pace is five feet; and 60000 such paces make one degree of the equator. See the article DEGREE.

PACE, in the manege, is of three kinds, viz. walk, trot, and gallop; to which may be added an amble, because some horses have it naturally. See the articles WALK, TROT, &c.

Horses which go shuffling or mixed paces, between the walk and amble, are for the most part of no value; which commonly proceeds from their fiery temper, and sometimes from a weakness in their reins or legs.

PACHAMAC, a temple of Peru, in South America, dedicated by the Indians to the supreme being: it gives its name to the adjacent country.

PACHODECARHOMBIS, in natural history, the name of a genus of fossils, of the class of the selenitæ, expressing a thick rhomboidal body, composed of ten planes. See the article SELENITÆ.

The characters of this genus are, that the selenitæ of it consist of ten planes; but as the top and bottom in the leptodecarhombes, or most common kind of the selenitæ, are broader and larger planes than any of the rest, the great thickness of this genus, on the contrary, make its four longer planes in all the bodies of it, meeting in an obtuse angle from its sides, its largest planes. Of this genus there are only four known species. 1. A very pellucid one, with slender transverse striæ. This is frequent in the clay-pits of Northamptonshire, and some other countries; and the common people have an opinion, that it is good to stop hæmorrhages; whence it has acquired among them the common name of staunch. 2. A dull-looking kind, with very fine transverse filaments. This is found in the clay-pits of Northamptonshire, Staffordshire, and Yorkshire. 3. A fine and beautiful

kind, with very slender longitudinal filaments. This is common in Yorkshire, and seems almost peculiar to that country; it is not only found there in digging, but frequently lies on the surface of the earth. And, 4. A brown pellucid kind, found very frequently in Germany, and sometimes in England.

PASCHU, an island in the Mediterranean, near the coast of Epirus, in european Turkey, subject to Venice: east long. $20^{\circ} 45'$, and north lat. $39^{\circ} 15'$.

PACIFIC OCEAN, or SOUTH-SEA, that vast ocean which separates Asia from America: it is called Pacific, from the moderate weather the first mariners who sailed in it, met with between the tropics; and it was called South-sea, because the Spaniards crossed the isthmus of Darien from north to south, when they first discovered it: though it is properly the Western ocean, with regard to America.

PACIFIC LETTERS. See the article *Pacific* LETTERS.

PACIFICATION, in matters of polity, signifies the restoring of the public tranquillity. Hence,

PACIFICATOR signifies much the same with mediator, or one who endeavours to reconcile princes or states at variance. See the articles PEACE and TREATY.

PACK, in commerce, denotes a quantity of goods, made up in loads, or bales, for carriage.

A pack of wool is seventeen stone and two pounds, or a horse's load.

PACKAGE, is a small duty of one penny in the pound, paid for all goods not particularly rated.

PACKERS, persons whose employment it is to pack up all goods intended for exportation; which they do for the great trading companies and merchants of London, and are answerable if the goods receive any damage through bad packing.

PACOS, in zoology, a species of peruvian camel, without any gibbosity, erroneously reckoned by some a sheep: it is only three feet and an half high, from the ground to the top of the back; but the neck is very long, so that when the head is carried erect it is pretty tall. See the article CAMEL.

Like the glama, it is sometimes employed in carrying burdens: its flesh is very well tasted.

PACT, or PACTION, *pañum*, in law, denotes a contract, or agreement, between two or more parties. See CONTRACT.

PACTA,

PACTA CONVENTA, in Poland, are the articles agreed on between the king and the republic, which they mutually oblige each other to observe.

PACTOLUS, a river of Lydia, in the lesser Asia, celebrated by the antient poets for its golden sands.

PADANG, a port-town on the west coast of the island of Sumatra, in the East-Indies, in possession of the Dutch : east long. 99° , south lat. $1^{\circ} 5'$.

PADDLE, in glass-making, an instrument with which the workmen stir about the sand and ashes in the calcar. See the articles **CALCAR** and **GLASS**.

PADDOC, or **PADDOC-COURSE**, a piece of ground encompassed with pales or a wall, and taken out of a park for exhibiting races with grey-hounds, for plates, wagers, or the like.

A paddoc is generally a mile long, and a quarter of a mile broad; at one end a little house where the dogs are to be entered, and whence they are slipped; near which are pens to inclose two or three deer for the sport. Along the course are several posts, *viz.* the low post, which is an hundred and sixty yards from the dog-house and pens; the quarter of a mile post, half mile post, and pinching post; besides the ditch, which is a place made to receive the deer, and preserve them from farther pursuit. And near this place are seats for the judges chosen to decide the wager.

The keepers, in order to slip the dogs fairly, put a falling collar upon each, slipped through a ring, and the deer being turned loose, and put forward by a reazer, as soon as he is arrived at the law post, the dog-house door is thrown open, and the dogs slipped. If now the deer swerve so much, as that his head is judged nearer the dog-house than the ditch before he arrive at the pinching-post, it is no match, and must be run over again three days after; but if the deer runs straight beyond the pinching-post, then that dog that is nearest when he swerves, or is blanced by any accident, wins the match; but if no such swerve happens, then the match is won by the dog who first leaps the ditch.

PADERBORN, the capital of the bishopric of the same name in Westphalia : east long. $8^{\circ} 25'$, north lat. $51^{\circ} 45'$.

PADRON, a town of Spain, in the province of Galicia, fifteen miles south of Compostella.

PADSTOW, a market-town of Corn-

wall, thirty miles west of Launceston.
PADUA, the capital of the Paduan, in Italy, a city of a circular form, situated twenty-two miles west of Venice : east long. $12^{\circ} 15'$, north lat. $45^{\circ} 30'$.

PADUAN, a province of Italy, in the territories of Venice, thirty-five miles long, and almost as much in breadth; bounded by the Trevisane, on the north: by the dutchy of Venice on the east; by the Polesin de Rovigo, on the south; and by the Vicentin, on the west.

PADUAN, amongst the medalists, a modern medal struck in imitation of the antique; or a new medal struck with all the marks and characters of antiquity. This name is properly applicable to those medals only that were struck, in the seventh century, by an italian painter, born at Padua; who succeeded so well in the imposture, that the best judges are at a loss to distinguish his medals from the genuine ones. Though it is frequently used in general for all medals of this kind.

PADUS, the **LAUREL**, or **BIRD'S CHERRY**, in botany, a species of *prunus*. See the article **PRUNUS**.

The fruit of this plant is recommended to be hung about the neck of children subject to epilepsies. It is of an emollient, and heating nature.

PÆAN, among the antient pagans, was a song of rejoicing sung in honour of Apollo, chiefly used on occasions of victory and triumph.

PÆAN, in the antient poetry, a foot consisting of four syllables; of which there are four kinds, the pæan primus, secundus, &c. See the article **FOOT**.

The pæan primus consists of one long syllable and three short ones, or a trochæus and a pyrrhichius, as *temporibus*; the pæan secundus consists of a short syllable, a long, and two short, or an iambus and a pyrrhichius, as *potentia*; the pæan tertius consists of two short syllables, a long and a short one, or a pyrrhichius and a trochæus, as *animatus*; the pæan quartus consists of three short syllables and a long one, or a pyrrhichius and iambus, as *celeritas*.

PÆDAGOGUE, or **PEDAGOGUE**. See the article **PEDAGOGUE**.

PÆDARTHROCACES, in surgery, a disease of the bones, raising them into tumours near the joints, and differing from the *spina ventosa*, in that it is not attended either with violent pains or erosion of the bone and adjacent parts. See the article **SPINA VENTOSA**.

This

This disease is most frequently found in the joints of children: for as the bones of children are more soft and spongy than the bones of adults and old persons, they are so much the easier distended by humours, and more frequently form tumours. See **CARIES** and **EXOSTOSIS**.

PÆDEROTA, in botany, a genus of the diandria-monogynia class of plants, the corolla whereof consists of a single petal; the tube is cylindric, and of the length of the cup; the limb is formed as it were into two labia; the upper lip is oblong, hollow, and narrow; the lower lip is broader, and is divided into three equal segments at the extremity: the fruit is an oval capsule, compressed at the top, and bifid, composed of four valves, and containing two cells, in each whereof there are numerous, obtuse, oblong seeds, which adhere to a columnar receptacle.

PÆDO-BAPTISM, infant-baptism, or that conferred on children. See **BAPTISM**.

PÆONIA, **PIONY**, in botany, a genus of the polyandria-digynia class of plants, the corolla whereof consists of five roundish, concave petals, very large, patent, and narrow towards the base: the fruit consists of two capsules, reflexo-patent, of an oblong, oval figure, hairy, containing each one cell, formed each of a single valve, and opening longitudinally inwards: the seeds are numerous, oval, smooth, beautiful, and coloured. The number of the germina, though naturally two, varies greatly: in some flowers there are five.

The root of this plant is a very celebrated medicine in nervous cases. We have instances well attested of epilepsies being solely cured by it. It is good also in all disorders of the head, and in hysterical complaints: it promotes the menses, and removes obstructions of the viscera.

PAGAN, *paganus*, a heathen, gentile, or idolater; one who adores false gods. See the article **PAGANISM**.

PAGANALIA, certain festivals observed by the antient Romans in the month of January. They were instituted by Servius Tullius, who appointed a certain number of villages (*pagi*), in each of which an altar was to be raised for annual sacrifices to their tutelar gods; at which all the inhabitants were to assist, and give presents in money, according to their sex and age, by which means the number of country-people was known. The servants upon this occasion offered

cakes to Ceres and Tellus, to obtain plentiful harvests.

PAGANELLUS, in ichthyology, the name of a fish of the sea-gudgeon or rock-fish kind, called by authors *gobius marinus*. See the article **GOBII**.

This fish has a yellow transverse line on the top of the first back-fin. It grows to about six inches in length, and is thick in proportion.

PAGANISM, the religious worship and discipline of pagans; or, the adoration of idols and false gods. See **IDOLATRY**.

The gods of paganism were either men, as Jupiter, Hercules, Bacchus, &c. or fictitious persons, as Victory, Fame, Fever, &c. or beasts, as in Egypt, Crocodiles, Cats, &c. or, finally, inanimate things, as Onions, Fire, Water, &c.

PAGE, a youth of state retained in the family of a prince or great personage, as an honourable servant, to attend in visits of ceremony, do messages, bear up trains, robes, &c. and at the same time to have a genteel education, and learn his exercises. The pages in the king's household are various, and have various offices assigned them; as pages of honour, pages of the presence chamber, pages of the back stairs, &c.

This word is used in the turkish seraglio for the children of tribute, or slaves who wait on the grand seignior: they are commanded by the chief aga, and constitute four classes, called *oda's*.

PAGE of a book. See **PRINTING**.

PAGEANT, a triumphal car, chariot, arch, or other like pompous decoration, variously adorned with colours, flags, &c. carried about in public shews, processions, &c.

PAGO, an island in the gulph of Venice, separated from the continent of Morlachia by a narrow channel; being forty miles long, and twelve broad, situated in east long. $16^{\circ} 12'$, north lat. $45'$.

PAGOD, or **PAGODA**, a name whereby the East-Indians call the temple in which they worship their gods.

Before they build a pagod, they consecrate the ground as follows: after having enclosed it with boards or palisadoes, when the grass is grown on the ground they turn an ash-coloured cow into it, who stays there a whole day and night; and as cow-dung is thought by the Indians to be of a very sacred nature, they search for this sacred deposit, and having found it, they dig there a deep pit, into which they put a marble-pillar, ris-

ing considerably above the surface of the earth. On this pillar they place the image of the god to whom the pagod is to be consecrated. After this the pagod is built round the pit, in which the pillar is fixed. The pagod usually consists of three parts, the first is a vaulted roof supported on stone or marble-columns. It is adorned with images, and, being open, all persons without distinction are allowed to enter it: the second part is filled with grotesque and monstrous figures, and no body is allowed to enter it but the bramins themselves: the third is a kind of chancel, in which the statue of the deity is placed: it is shut up with a very strong gate. This word is sometimes used for the idol, as well as for the temple.

PAGOD, or **PAGODA**, is also the name of a gold and silver coin, current in several parts of the East-Indies. See **COIN**.

PAIN, *dolor*, is defined to be an uneasy sensation arising from a sudden and violent solution of the continuity, or some other accident in the nerves, membranes, vessels, muscles, &c. of the body; or, according to some, it consists in a motion of the organs of sense; and, according to others, it is an emotion of the soul occasioned by these organs.

There are various kinds of pain, one is attended with pulsation, another with a sense of incumbent weight, another with a tension; there is a pain which attends erosion, incision, puncture, and perforation, comprehended with these and the like differences under the name acute; and, lastly, there is a pain attended with a torpor and numbness.

Besides the above-mentioned, there are other distinctions of pain: thus some pains are fixed, others moveable and wandering, as it often happens in a redundancy of humours: some pains are continual, and others intermittent; some intense, others remiss; some again afflict the patient in the beginning of the disease, others afterwards; and sometimes they arise on the critical day, sometimes not; and to mention no more, some pains are seated in the external parts, others in the internal; some in the noble, others in the ignoble parts.

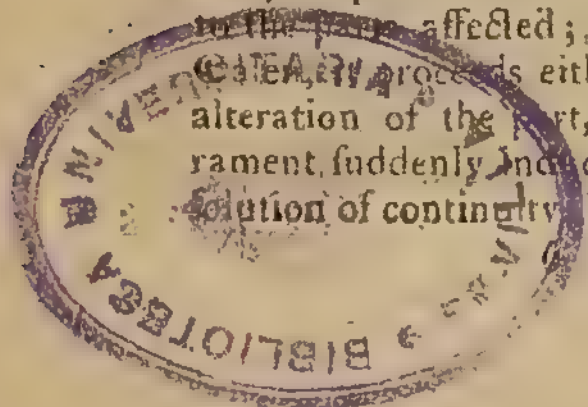
All pain proceeds from some injury done to the part affected; and according to Celsus, it proceeds either from a sudden alteration of the part, or a new temperament suddenly introduced, or else from a solution of continuity. The internal parts

suffer pain from the violence of a fever, by which the nervous parts are dried and vellicated, or from an inflammation, an erysipelas, some great obstruction or abscess in the viscera, or, lastly, from a flatus. Now since these pains owe their rise to such causes, they are justly denominated bad, as well when alone, as when attendant on other distempers; for all pain exhausts the strength, promotes crudities, and impedes the concoction of the humours. The worst pains are those excited in the viscera and noble parts; and of these the most pernicious on all accounts are pains affecting the viscera in a violent manner, and of a long and constant duration, by which the natural heat of the viscera is destroyed, or resolved, and no room left to hope for a happy event.

Pain is mitigated or assuaged divers ways; as, 1. By diluting and softening acrimonies with warm water mixed with flour, applied by way of drink, fomentation, clyster, or bath. 2. By resolving and washing away obstructions by the same means, and resolvents. 3. By relaxing the nervous vessels with drinks, fomentations, baths, relaxants, anodynes, and aperients. 4. By correcting the acrimony itself with proper remedies. 5. By freeing the obstructed, and acrimonious parts from the too great pressure of the vital humours, and by softening, suppurating, and depurating them. 6. By rebating or deadening the sense by narcotics, either internally or externally. See the articles **NARCOTICS**, and **ANODYNE**.

For pains after delivery. See the article **DELIVERY**.

PAIN FORT ET DURE, in law, signifies a particular punishment inflicted on a person who being arraigned for felony, refuses to put himself upon the common trial of God and his country, but instead thereof obstinately stands mute: this punishment is vulgarly called pressing to death. The judgment of this penance is by the common law, and it is usually practised as follows, viz. that the prisoner be remanded back to prison, and put into some low dark room, and there laid flat on his back on the ground, without any other covering than what is necessary to hide his nakedness, and that his legs and arms be extended with cords to the four quarters of the room, at which time there is to be laid on his body as much weight, or more, than he can



can bear, and all the time he is to have no other support than the worst of bread and water, and is not to drink the same day that he eats, nor eat the day he drinks, and in this condition to remain till he dies. See the article MUTE.

PAINTING, the art of representing natural bodies, and giving them an appearance of life, by the turn of lines, and the degrees of colours.

Whoever would apply himself to painting, says that celebrated Italian painter Leonardo da Vinci, must in the first place learn perspective: this will enable him to dispose things in their proper places, and to give the due dimensions to each: having done this, he must learn to design; choosing for that purpose some able master, who at the same time may give him some insight into the colours of figures: he ought then to consult nature, to confirm himself in what he has already learnt; and, lastly, let him apply himself to the study and imitation of the greatest masters, in order to get a habit of reducing what he has learnt into practice. See the articles DRAWING, DESIGN, PERSPECTIVE, &c.

To judge of the goodness of a painting, says Mr. Richardson, it is necessary to establish to ourselves a system of rules to be applied occasionally; and to assist the judgment herein, the following rules have been laid down: 1. The subject must be finely imagined, and, if possible, improved in the painter's hands; he must think well as an historian, poet, philosopher, or divine, and more especially as a painter, in making a wise use of all the advantages of his art, and in finding expedients to supply its defects. 2. The expression must be proper to the subject, and the characters of the persons: it must be strong, so that the dumb shew may be perfectly and readily understood: every part of the picture must contribute to this end; colours, animals, draperies, and especially the actions of the figures, and above all the airs of the heads. 3. There must be one principal light, and this, and all the subordinate ones, with the shadows and repotes, must make one entire and harmonious mass; the several parts must be well connected and contrasted, so as to render the whole as grateful to the eye, as a good piece of music to the ear. By this means the picture is not only more delightful, but better seen and comprehended. 4. The drawing must be just; nothing must be

flat, lame, or ill-proportioned; and these proportions should vary according to the characters of the persons drawn. 5. The colouring, whether gay or solid, must be natural, beautiful and clean, and what the eye is delighted with, in shadows, as well as lights and middle tints; and whether the colours are laid on thick, or finely wrought, they must appear to be done by a light and accurate hand. Lastly, nature must be the foundation that must be seen at the bottom; but nature must be raised and improved, not only from what is commonly seen, to what is but rarely met with, but even yet higher, from a judicious and beautiful idea in the painter's mind, so that grace and greatness may shine throughout, more or less according to the subject. See COLOURING, CLARO-OBSCURO, &c.

Painting is of various kinds, according to the materials used, the matter upon which they are applied, and the manner of applying them; as painting in oil, in water-colours, fresco, &c.

PAINTING in oil. The whole secret of painting in oil consists in grinding the colours with nut oil, or linseed-oil; but the manner of working is very different from that in fresco, or in water, by reason the oil does not dry near so fast, which gives the painter an opportunity of touching and re-touching all the parts of his figures as often as he pleases; which in the other methods of painting is a thing impracticable. The figures done in oil, are also capable of more force and boldness; insomuch that the black becomes blacker, when ground with oil, than with water; besides, all the colours mixing better together, makes the colouring the sweeter, more delicate and agreeable, and gives an union and tenderness to the whole, inimitable in any of the other manners.

Painting in oil is performed on canvas, on walls, wood, stone, and all sorts of metals. 1. Painting on cloth or canvas is done as follows: the canvas being stretched on a frame, give it a layer of size, or paste water, and then go over it with a pumice-stone, to smooth off the knots. By means of the size, the little threads and hairs are all laid close on the cloth, and the little holes filled up, so that no colour can pass through. When the cloth is dry, lay on oker in oil, which may be mixed with white-lead to make it dry the sooner. When dry, go over it again with the pumice-stone.

stone, to make it smooth. After this a second couch is sometimes applied, composed of white-lead and a little charcoal-black, to render the ground of an ash-colour. Others prime the canvas in the following manner, they first smooth the canvas with a pumice-stone, size it over with good size, and a little honey, and let it stand to dry; after which they lay it over with whiting and size, mixed with a little honey: the use of the honey is to prevent it from cracking, peeling, and breaking out; on this they first draw the picture with a coal, and then lay on the colours. 2. Painting on walls: when the wall is dry, they give it two or three washes with boiling oil; till the plaster remains quite greasy, and will imbibe no more; upon this they lay drying colours, such as white-chalk, red-oker, or other chalks beaten pretty stiff. When this couch or layer is well dried, the subject, or design is sketched out, and afterwards painted over, mixing a little varnish with their colours, to save the varnishing afterwards. In order the better to fortify the wall against moisture, some cover it with a plaster of lime, marble dust, or a cement made of beaten tiles soaked in linseed-oil: and at last prepare a composition of green-pitch, mastic, and thick varnish boiled together, which they apply hot over the former plaster; and when dry, lay on the colours as before. Others, in fine, make their plaster with lime-mortar, tile-cement, and sand; and this being dry, they apply another of lime, cement, and iron-scoriæ; which being well beaten, and incorporated with linseed-oil, and whites of eggs, makes an excellent plaster. When this is dry, the colours are laid on as before. 3. In painting on wood, they usually give their ground a couch or layer of white tempered with size, and then proceed as in painting on walls. 4. In painting on stone or metals, it is not necessary to lay them over with size, but only to add a slight couch of colours before the design is drawn on it; nor even is this done on stones, where you would have the ground appear, as in certain marbles and agates of extraordinary colours.

All the colours used in fresco are good in oil, except white of lime and marble-dust. Those chiefly used are white-lead, or ceruse, yellow and white masticot, or pigment, vermillion, lacca, blue and green

ashes, verdigrease, indigo, smalt, black lead, ivory-black, lamp-black, &c. As to oils, the best are those of linseed, walnuts, spike, and turpentine. The drying oils or nut-oil, boiled with litharge and sandarach, and otherwise with spirit of wine, mastic and gum-lacca.

In the preparation of oil-colours, care must be taken, that they be ground fine; that in putting them on a pallet, those which will not dry of themselves be mixed with drying oil, or other ingredients of a drying quality; and that the tinged colours be mixed in as small quantities as possible. As to the situation of the colours, the purest and strongest must be placed in the front of the piece, and the colouring varied according to the subject, time and place. If the subject be grave, melancholy, or terrible, the general tint of the colouring must incline to brown, and black, or red and gloomy; but it must be gay and pleasant in subjects of joy and triumph. See the article COLOURING.

For the other different methods of painting, see ENAMEL, FRESCO, GLASS, LIMNING, MINIATURE, &c.

PAIR, *par*, denotes two equal and similar things joined together, either collectively, as a pair of gloves, or two similar parts that compose one whole, or a set of things joined to make another complete, &c.

PAIR, in anatomy, an assemblage, or conjugation of two nerves, which have their origin together in the brain, or spinal marrow, and thence distributed into the several parts of the body, the one on one side, and the other on the other.

PAIS-RECONQUIS, a part of Picardy, in France, formerly in possession of the English, but lost in the reign of queen Mary, anno 1558.

PAITA, a town of Peru, in South America, in west long. 80°, south lat. 5°.

PAIX, a port-town situated on the north side of the island of Hispaniola, in west long. 72° 30', north lat. 20°.

PALACE, *palatium*, a name generally given to the dwelling-houses of kings, princes, and other great personages; and taking different epithets, according to the quality of the inhabitants, as imperial palace, royal palace, pontifical palace, cardinal palace, ducal palace, episcopal palace, &c.

PALACIOS, a town of Spain, in the province of Andalusia, situated fifteen miles south of Seville.

PALÆSTRA, in grecian antiquity, a public building, where the youth exercised themselves in wrestling, running, playing at quoits, &c.

Some say the palæstra consisted both of a college and an academy, the one for exercises of the mind, the other for those of the body; but most authors rather take palæstra to be a xystus, or mere academy for bodily exercises. Hence,

PALÆSTROPHYLAX was the director of the palæstra, and the exercises performed therein. See the preceding article.

St. PALAIS, a town of France, in the province of Gascony, capital of the lower Navarre, situated in west long. $1^{\circ} 8'$, north lat. $43^{\circ} 23'$.

PALAMBOANG, or **PALAMBANG**, the capital of a kingdom at the east end of the island of Java, in the East-Indies, situated on the straits of Bally, in east long. 114° , south lat. $7^{\circ} 30'$, and separated from the island of Bally by a narrow strait.

PALAMOS, a port-town of Spain, in the province of Catalonia, situated on the Mediterranean, fifteen miles south-east of Girona.

PALANKA, a town of upper Hungary, situated thirty miles north of Buda.

PALANQUIN, a kind of chaise, or chair, borne by men on their shoulders, much used by the people of China, and the east, as a vehicle for their easy conveyance from place to place.

PALARIA, among the Romans, a kind of exercise, performed at a stake by the soldiers. The stake being fixed in the ground, and six feet high above it, the young undisciplined soldiers advanced against it, armed with a hurdle and cudgel, instead of a shield and sword, and went through all the rules of attack and defence, as if actually engaged with an adversary. Sometimes they stood at a distance, and attacked it with missive weapons, at the same time using all the requisite motions for defending themselves, and warding off what might be thrown against them.

PALATE, *palatum*, in anatomy, the flesh that composes the roof, or the upper and inner part of the mouth. See the article **MOUTH**.

The palate has much the same structure with the gums, but it has also a great number of glands, discovered so early as the time of Fallopius: these are principally situated in the hinder part near the uvula, where it is pendulous, in the

manner of a curtain, which part is called the velum, or claustrum, of the palate. The glands situated particularly in this part, secrete a mucous fluid, serving to lubricate the mouth and throat, and to facilitate deglutition: they have a great number of apertures there for the discharge of this humour into the mouth. See the article **GLAND**.

The great uses of this membrane are to defend the bones of the palate from corrupting, and for preventing by its claustrum or velum, the things to be swallowed from getting up into the nostrils.

Wounds of the palate and other parts of the mouth, are only to be healed by being anointed with honey of roses, either alone, or mixed with balsam of Peru, or with oil of myrrh per deliquium.

Ossa PALATI, bones of the palate. These are two, situated in the posterior part of the arch of the palate, between the pterygoide apophysis, and the ossa maxillaria, and running up on the sides of the nasal fossæ all the way to the bottom of each orbit. The figure of these bones is very irregular: the vomer is joined to them in the furrow of their upper surface. Their uses are first to form the palate, the orbit, and the maxillary sinus; secondly, to sustain the membrane of the palate, and uvula; and thirdly, to assist in the modulation of the voice. See the articles **MAXILLA**, **VOMER**, &c.

PALATINATE, a province, or signory, possessed by a palatine.

PALATINATE of Bavaria, or, *the upper PALATINATE*, in the circle of Bavaria, in Germany, is bounded by Voightland, in the circle of upper Saxony, on the north; by Bohemia and Austria on the east; by the river Danube, which separates it from the duchy of Bavaria, on the south; and by Swabia, and part of Franconia on the west; being about seventy miles long, and forty broad.

PALATINATE of the Rhine, situated in the circle of the lower Rhine, is bounded by the archbishoprics of Mentz and Triers on the north; by the circles of Franconia and Swabia on the east; and by Alsatia and Lorrain on the south and west; being upwards of a hundred miles long, and about seventy broad.

PALATINE, or **COUNT PALATINE**, a title antiently given to all persons who had any office or employment in the prince's palace; but afterwards conferred on those delegated by princes to hold courts

courts of justice in the provinces; and on such among the lords as had a palace, that is a court of justice, in their own houses.

At present the word palatine is restrained to a prince of Germany, or a lord of Poland, possessed of a palatinate.

PALATINE GAMES, in roman antiquity, games instituted in honour of Augustus by his wife Livia, after he had been enrolled in the number of the gods. They were celebrated in the palace, and were continued by the succeeding emperors.

PALATINE TRIBES, one of the four tribes into which Rome was antiently divided by Servius Tullius.

PALATO SALPINGÆUS, called also musculus tubæ novus Vallæ, and pterygostaphylinus externus, a muscle arising broad and tendinous from the edge of the lunated part of the os palati; several of its fibres being spread on the membrane that covers the foramen narium, whence growing into a small thin tendon, it is reflected about the hook-like process of the inner wing of the processus pterygoidæus internus, and is inserted carnos into all the membranous, fleshy, and cartilaginous parts of the tube, which leads from the palate to the ear. Its use is to dilate and keep open this tube.

PALATO-STAPHYLINUS, in anatomy, a muscle arising on each side from the junction of the bones of the palate. It is broad at its beginning, but afterwards joins its associate, and becomes then narrower, so as to resemble a triangle, which descends from the place of its origin to the uvula, and is inserted into its upper part: it draws it upward and forward.

PALAZULO, or **PLAZZO**, a town of Sicily, in the Val. de Noto, situated eighty miles south-west of Messina.

PALAZULO, a town of Italy, in the territory of Venice, and province of Brescia, situated on the river Oglio, twenty-six miles north-east of Milan.

PALE, *palus*, a little pointed stake or piece of wood, used in making inclosures, separations, &c. The pale was an instrument of punishment, and execution among the antient Romans, and still continues so among the Turks. Hence, empaling, the passing a sharp pale up the fundament through the body.

PALE, in heraldry, one of the honourable ordinaries of an escutcheon; being the representation of a pale or stake placed upright, and comprehending the whole

height of the coat from the top of the chief to the point. When the pale is single, it is to contain one third of the breadth of the shield. See pl. CLXXXIX. fig. 5.

When there are several, more properly called pallets, they are proportioned so as that two take up two fifths of the shield, and three take up three-sevenths; and in those cases the number of pieces are specified, as well as that of those they are charged withal, &c.

Pales are borne various ways, as wavy, crenelle, faillis, indented, ingrailed, inverted, &c. There are also cometed and flaming pales, which are pointed, sometimes waved, &c.

PALE, **PALED**. See the article **PALY**.

In **PALE**, is applied to things borne above one another in manner of a pale.

Parti per **PALE**. See the article **PARTI**.

PALED FLOWERS, in botany, are those which have their leaves set about, or surrounding, an head, or thrum, as in marigolds, &c.

PALES, or **PILES**, in carpentry, denote rows of stakes driven deep into the ground to make wooden-bridges over rivers; they serve to support the beams laid across them, from one row to another, and are strongly bound with cross pieces.

PALENCIA, or **PLACENTIA**, a city of Spain, in the province of Leon, situated on the river Cea, sixty miles south-east of Leon.

PALERMO, the capital of the island of Sicily, situated on the north coast of that island, on a bay of the Mediterranean Sea: in east long. 13°, north lat. 38° 30'.

PALESTINE, a part of asiatic Turkey, situated between thirty-six and thirty-eight degrees of east longitude, and between thirty-one and thirty-four degrees of north latitude: it is bounded by Mount Libanus, which divides it from Syria on the north; by Mount Herman, which separates it from Arabia Deserta on the east; by the mountains of Seir and the Desarts of Arabia Petræa on the south; and by the Mediterranean Sea on the west.

It was called Palestine from the Philistines, who inhabited the sea-coasts. It was also called Judea, from Juda; and the Holy Land from our Saviour's residence and sufferings in it; and it is called Canaan, and the Promised Land in the scriptures.

It is 150 miles in length, and 80 in breadth; and in the time of Solomon it seems to have extended from the Mediterranean Sea to the river Euphrates.

PALESTRINA, a city of Italy, in the pope's territory and Campania of Rome, situated thirty miles east of Rome.

PALICAT, or **PELICATE**, a port-town of hither India, in Asia, situated on the coast of Coromandel: in east long. 80° north lat. 14°.

PALILIA, a feast among the antient Romans, in honour of the goddess Pales. The Palilia were celebrated with great festivity by the shepherds on the first of May, to beseech that goddess to take care of their flocks, and preserve them from wolves and diseases. Part of the ceremony consisted in burning heaps of straw, and jumping over them.

PALILICIUM, in astronomy, the star called the bull's-eye, or aldebaran. See the article **ALDEBARAN**.

PALIMBAM, a town on the island of Sumatra, in the East-Indies, situated in east long. 103°, south lat. 3°.

PALINDROMUS, *παλινδρομος*, a verse or sentence which runs the same when read either backwards or forwards; such is the verse,

Roma tibi subito montibus ibit amor.

Some people of leisure have refined upon the palindromus, and composed verses each word whereof is the same backwards as forwards, as that instance in Camden;

Odo tenet mulum, madidam mappam tenet Anna.

Anna tenet mappam madidam mulum tenet Odo.

PALING, a sort of fencing for fruit-trees planted in fields, wherein three small posts are erected at a foot and a half distance one from another, and near the top nailed to each other with cross-bars. In fixing the pales in form of a triangle, room is to be left for the tree to play and bow by the high winds, without galling: the trees are to be bound to a stake for a year or two, after which, fern or straw may be stuffed in betwixt the tree and uppermost rails to keep it upright. If the place be open to deer, rabbits, or the like, a post is to be nailed to the bar between every two pales.

PALINGENESIA, among divines, signifies the same with regeneration. Among chemists, it denotes the producing a body from its principles.

PALINODY, *παλινωδία*, a discourse contrary to a preceding one: hence the phrase *palinodiam canere* was taken for a recantation.

PALISADE, or **PALISADO**, in fortification, an inclosure of stakes or piles driven into the ground, each six or seven inches square, and eight feet long, three whereof are hid under-ground.

Palisadoes are generally used to fortify the avenues of open forts, gorges, half-moons, the bottoms of ditches, the parapets of covert ways, and in general all post liable to surprize, and to which the access is easy. Pallisadoes are usually planted perpendicularly, though some make an angle inclining towards the ground next the enemy, that the ropes cast over to tear them up may slip.

Turning **PALISADES**, are an invention of M. Coehorn, in order to preserve the palisades of the parapet of the covert-way from the besiegers shot.

He orders them so, that as many of them as stand in the length of a rod, or in about ten feet, turn up and down like traps, so as not to be in sight of the enemy till they just bring on their attack, and yet are always ready to do the proper service of palisades.

PALISADE, in gardening, denotes a sort of ornament; being a row of trees which bear branches and leaves from the bottom, cut and spread in manner of a wall along the side of an alley, or the like, so as to appear like a wall covered with leaves.

PALISSE, in heraldry, a bearing like a range of palisades before a fortification, represented on a fesse, rising up a considerable height, and pointed a-top, with the field appearing between them. See plate **CLXXXIX**. fig. 6.

PALIURUS, **CHRIST'S THORN**, in botany, a species of *rhamnus*. See the article **RHAMNUS**.

PALL, in heraldry, denotes a kind of cross representing the pallium, or archiepiscopal ornament sent from Rome to the Metropolitans. See plate **CXCIII**. fig. 1.

PALL, *pallium*, in matters of dress. See the article **PALLIUM**.

PALLA, in roman antiquity, a mantle which women wore over the gown called stola. It was borne on the left shoulder, whence passing to the other side, under the right arm, the two ends were bound under the left arm, leaving the breast and arm quite bare.

PALLADIUM, in antiquity, a statue of the

the goddess Pallas, supposed to have dropped down from heaven, preserved in Troy, whereon the fate of that city is said to have depended. It is said that there was antiently a statue of Pallas preserved at Rome, in the temple of Vesta, which some pretended to be the true palladium of Troy, brought into Italy by Æneas: it was kept among the sacred things of the temple, and only known to the priests and vestals. It was esteemed the destiny of Rome; and there were several others made perfectly like it to secure it from being stolen, as was that at Troy, which the oracle of Apollo declared should never be taken so long as the palladium was found within its walls: this occasioned Diomedes and Ulysses, in the time of the trojan war, to undertake the stealing of it.

PALLET, among painters, a little oval table, or piece of wood, or ivory, very thin and smooth; on, and round which, the painters place the several colours they have occasion for, to be ready for the pencil. The middle serves to mix the colours on, and to make the tints required in the work. It has no handle, but instead thereof, a hole at one end to put the thumb through to hold it.

PALLET, among potters, crucible makers, &c. a wooden instrument, almost the only one they use, for forming, heating, and rounding their works: they have several kinds, the largest are oval with a handle; others are round, or hollowed triangularly; others, in fine, are in manner of large knives, serving to cut off whatever is superfluous on the moulds of their work.

PALLET, in gilding, an instrument made of a squirrel's tail, to take up the gold leaves from the pillow, and to apply and extend them on the matter to be gilt. See the article **GILDING**.

PALLET, in heraldry, is nothing but a small pale, consisting of one half of it in breadth, and therefore there are sometimes several of them upon one shield.

PALLET is also a part belonging to the balance of a watch or movement. See the article **WATCH**.

PALLET, in ship-building, is a room within the hold, closely parted from it, in which by laying some pigs of lead, &c. a ship may be sufficiently ballasted, without losing room in the hold; which, therefore, will serve for the stowing the more goods.

PALLIATION, or a **PALLIATIVE CURE**,

in medicine, is when, in desperate and incurable diseases, after predicting the fatal event, the physician prescribes some remedies for mitigating the pain, or some other urgent symptoms, as in ulcerated cancers; or cancerous fistulas, and the like.

Palliative indication, is where the symptoms of a disease give too much trouble and danger to have their cure deferred till the disease whereon they depend is removed: here the symptoms themselves are to be cured or mitigated apart.

PALLIER, or **PAILLIER**, in building, denotes a landing-place in a stair-case. See the article **STAIR-CASE**.

PALLIFICATION, the strengthening the foundation of any building, by driving piles into the ground. See the articles **FOUNDATION** and **PILE**.

PALLIUM, or **PALL**, an archiepiscopal vestment, of white woollen cloth, about the breadth of a border, made round, and thrown over the shoulders. Upon this border there are two others of the same matter and form, one of which falls down upon the breast, and the other upon the back, each having a red cross upon it; several crosses of the same colour being likewise upon the upper part of it, about the shoulders.

The pall was part of the imperial habit, and originally granted by the emperors to patriarchs; but at present it is given by the pope as a mark of the apostolic power, without which neither the function or title of archbishop can be assumed by the bishops of his communion.

PALM, *palma*, in anatomy, the inside of the hand, called also *vola*. See the articles **HAND** and **PALMARIS**.

PALM is also a measure of length. See the article **MEASURE**.

PALM-SUNDAY, in the christian church, the Sunday next before Easter; being so called in memory of our Saviour's triumphal entry into Jerusalem, when the multitude that attended him strewed palm-branches in his way. See the article **EASTER**.

PALM-TREE, **PHOENIX**, in botany, &c. See the article **PHOENIX**.

PALMA, a town of Portugal, in the province of Alentejo: west long. 9°, north lat. 38° 30'.

PALMA is also a city of Terra Firma, in south-America: west long. 74°, north lat. 4° 30'.

PALMA, or **PALAMODA**, a town of Italy, eight miles north of Aquileia.

PALMA

PALMA-ISLE, one of the Canary-Islands, sixty miles north-west of Teneriff.

PALMARIS MUSCULUS, one of the flexor muscles of the hand, so called as being inserted into the palm of the hand by a broad expanded tendon: its office seems to be the constriction of the palm. There is also another muscle of the hand called *palmaris brevis*, and *quadratus*, in form of a small mass of flesh, which adheres to the aponeurosis of the former muscle, above the abductor muscle of the little finger: it is said to assist in drawing together the hand; but Heister observes, that both these muscles are found wanting in dissections.

PALMAS, or **CAPE PALMAS**, a promontory on the Guinea-coast: west long. 8°, north lat. 4° 30'.

PALMATED, something resembling the shape of the hand: thus we say palmated leaves, roots, stones, &c.

PALMIPEDES, among ornithologists, the same with web-footed birds. See the articles **BIRD** and **ORNITHOLOGY**.

PALMISTRY, a kind of divination, or rather a deceitful art practised by gypsies, who pretend to foretel events by looking upon the lines and marks of the hand: it is prohibited by stat. 1 and 2 Phil. & Mar. c. 4.

PALMYRA, the ruins of a magnificent city, in the province of Syria, two hundred miles south-east of Aleppo.

PALOS, a port-town of Spain, situated on the bay of Cadiz: west long. 7° 15', north lat. 37°.

Cape PALOS, is a promontory of Spain, twenty miles east of Carthagena.

PALOTA, a town of lower Hungary, forty miles south-west of Buda.

PALPABLE, something perceivable by the senses, particularly that of feeling.

PALPEBRÆ, the **EYE-LIDS**, in anatomy. See the article **EYE**.

PALPITATION, in medicine, a spastic contraction of the heart, when it leaps and beats violently.

The heart often palpitates so much as to be heard at a distance, which may be owing to a violent motion of the body; chiefly when plethoric people ascend high places: sometimes it happens through fear or dread; and sometimes from a bad conformation of the heart and the neighbouring vessels. Sleeping in the fields, suppression of the menses, and the like, are likewise said to occasion it. Bleeding in the foot, and gentle purges, are generally the first steps towards a cure;

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after which, saline, nitrous, and cinna-
barine medicines are to be used, particu-
larly the antispasmodic, to appease the
violent motions of the heart, and render
the blood more fluid. The aqueous in-
fusions of tea, balm, veronica, primroses,
or citrons, are likewise proper, especially
with the essence of scordium, *carduus*
benedictus, citron or orange-peel, with
a little dulcified spirit of nitre, or *terra*
foliata tartari, taken morning and even-
ing; as also temperate pediluvia, mode-
rate but frequent exercise, riding, mo-
derate diet, plenty of thin drink, whey,
mineral waters, especially the chalybeate
kind, are all very useful in this disease.

PALSGRAVE, among the Germans, the
same with *palatine*. See the article
PALATINE.

PALSY, *παραλυσις*, in medicine, a disease
wherein the body, or some of its mem-
bers, lose their motion, and sometimes
their sensation of feeling.

The apoplexy, says Dr. Mead, when
not mortal, frequently terminates in
a palsy, which is the crisis of the dis-
ease: this palsy generally seizes but
one side of the body; and what Mor-
gagni observes, after Valsalva, that, on
dissection of the bodies of apoplectics
who had been seized with a hemiplegia,
he always found the cause of the disease
in the opposite side of the brain, the
doctor says he has formerly found true
more than once in St. Thomas's hospital.
There is now no longer any room for
blood-letting, or drastic purges; it will
be sufficient to give warm and moderate
cathartics now and then, such as the tinc-
tura sacra. And as the disease is now
become chronical, instead of blisters it
will be requisite to make issues in proper
places, especially in the nape of the neck,
and above the scapulæ, either with the
actual cautery, or with caustic medi-
cines. Hippocrates advises to apply the
actual cautery in eight places, at least,
and specifies them.

The cure is to be chiefly prosecuted with
aromatic strengtheners and steel; and
besides, it is of service to stimulate the
skin of the paralytic part; which is ex-
tremely well effected by the green oint-
ment, mixed with the seventh or eighth
part of the strong spirit of vitriol; and,
when the part begins to be rubified, the
liniment is to be removed, and the part
anointed with ointment of elder. Cold
bathing is very beneficial in persons not
too far advanced in years; but hot
bathing

bathing is prejudicial to all paralytics; some of whom the doctor has known sent to Bath by a mistaken notion of their physicians, who, upon coming out of the bath, were seized with a return of the apoplexy, which carried them off.

Wherefore the doctor makes the following remarks on these waters. Their chief virtue seems to consist in a certain mineral heat, whereby they warm and cherish the stomach and intestines; and, therefore, they are chiefly serviceable to those who have ruined their appetite and digestive faculty by drinking wine or other spirituous liquors, which is well known to be the cause of a number of evils: but they are very prejudicial to all whose inward parts, as the brain, lungs, liver, or kidneys, are too hot. And, for the same reason, though they may be agreeable to, and mend, the stomach, yet, if the use of them be continued too long, they more frequently hurt this organ: that very warmth which was beneficial at first, by immoderate perseverance, becoming prejudicial, by over-relaxing the fibres. A circumstance which the doctor several times observed, more particularly in patients whose diseases were owing to a fault in the nervous fluid.

This disease never is acute, is often tedious, and in old people almost incurable; and the patient for the most part drags a miserable life. For the vigour of his mind, together with his memory are lost, or vastly impaired; he totters and shakes, and becomes a dismal sight; as if no longer a man, but an animal half dead.

PALUDAMENTUM, in roman antiquity, a habit that differed in little from the chlamys, except that this last belonged chiefly to the lower class of people. See the article **CHLAMYS**.

However, they are promiscuously used for each other; being the robes of state proper to emperors, kings, consuls, and generals during their triumph.

PALUMBERIUS, **ACCIPITER**, the goshawk. See the article **GOSHAWK**.

PALUMBUS, the **RINGDOVE**, a beautiful species of pigeon, with the neck white on each side, and a brown spot behind. See the article **COLUMBA**.

PALUS MEOTIS. See **MEOTIS**.

PALY, or **PALE'**, in heraldry, is when the shield is divided into four or more equal parts, by perpendicular lines falling from the top, to the bottom. See plate **CXCIII**, fig. 2.

Paly-bendy is when the escutcheon is divided by perpendicular lines, which is paly; and also by diagonals, which is called bendy. See the article **BENDY**.

PAMIERS, a town of Languedoc, thirty miles south of Toulouse.

PAMPELUNA, the capital of Spanish Navarre, is the see of a bishop, and an university: west long. $1^{\circ} 30'$, north lat. $43^{\circ} 15'$.

PAMPELUNA, is also a city of Terra Firma, in south America: west long. 72° , north lat. 7° .

PAMPHYLIA, the antient name of a part of Carimania.

PAMPINIFORME CORPUS, in anatomy, a plexus, or knot, formed by the spermatic veins and arteries, and included in a common coat, within the testicle. See the article **TESTICLE**.

PANACEA, among physicians, denotes an universal medicine, or a remedy for all diseases; a thing impossible to be obtained, according to no less an author than Boerhaave.

Some also give the appellation panacea to certain plants, called in english alheals.

PANADA, a diet consisting of bread boiled in water to the consistence of a pulp, and sweetened with a little sugar. It is given to young children, and to sick persons, whose digestion is weak, or where stronger foods would be improper. It is sometimes made thin, to serve as a drink.

PANAMA, the capital city of the province of Darien, in south America, where the treasures of gold and silver, and the other rich merchandize of Peru are lodged in magazines till they are sent to Europe: west long. 82° , north lat. 9° .

PANARIA, one of the Lipari islands, thirty miles north of Sicily: east long. 15° , north lat. 39° .

PANARIS, or **PARONYCHIA**, in medicine and surgery. See **PARONYCHIA**.

PANARO, a river of Italy, which rising in the appenine mountains, on the confines of Tuscany, divides Modena from Romania, and then running through the Ferrarese, falls into the Gulph of Venice.

PANATHENÆA, *παναθηναία*, in grecian antiquity, an antient athenian festival, in honour of Minerva, who was the protectress of Athens, and called Athena. There were two solemnities of this name, one of which was called the greater panathenæa, and celebrated once in five years; and the other, the lesser panathenæa.

panathenæa, kept every third year, or, as some think, every year. At the celebration of the lesser festival, there were three games, managed by ten presidents elected out of the ten athenian tribes. On the evening of the first day was a torch race, first by men on foot, and next by horsemen. The second contention was a gymnical exercise, in which the disputants gave proofs of their strength and activity. The last was a musical contention: and afterwards the pyrrhic dance was performed by young boys in armour. Lastly, they offered a costly sacrifice, towards which, every one of the athenian boroughs contributed an ox. In the greater panathenæa, most of the same rites and ceremonies were practised, but with greater splendor, with the addition of some others, as particularly a procession, in which Minerva's sacred garment was carried; on this garment the achievements of Minerva, &c. were embroidered with gold, by a select number of young virgins.

PANAX, GINSENG, in botany, a genus of the pentandria-digynia class of plants, the general corolla of which is uniform; the partial corolla consists of five, oblong, crooked, equal petals: the fruit is a roundish berry, having one cell, and is coronated with the cup: the seeds are two, and of a kidney-like shape.

The numerous virtues of this plant have been already given under **GINSENG**.

PANAY, the capital of the isle of Panay, one of the Philippine islands; east long. 119°, and north lat. 11°.

PANCARPUS, in roman antiquity, a kind of shew which the roman emperors frequently exhibited to the people. In this spectacle, the circus being set all over with large trees, represented a forest, into which the beasts being let from the dens under the ground, the people, at a sign given by the emperor, pursued, shot, cut in pieces, and killed all they could lay hold of, which they afterwards carried away, to regale upon at home. The beasts usually given on these occasions were boars, deer, oxen, and sheep.

PANCH, or **PAUNCH**. See **PAUNCH**.

PANCHREAS, or **PANCREAS**. See the article **PANCREAS**.

PANCHREST, in medicine, the same with panacea. See **PANACEA**.

PANCHYMAGOGUE, in pharmacy, a name given to some cathartic extracts, that have the reputation of purging off all kinds of humours. The most celebrated

of which, are that of Crollius, and that of Hartman. Crollius's panchymagogue is an extract of the pulp of colocynthida, of pulvis diarrhodon abbatis, agaric, and black hellebore. That of Hartman is an extract made from sena-leaves, rhubarb, black hellebore-root, white resinous turpeth, polypody of the oak, trochisci, alhandal, troches of agaric, and aloes.

PANCRATIUM, *πασπαλιον*, among the ancients, a kind of exercise, which consisted of wrestling and boxing. In these contests it was customary for the weaker party, when he found himself pressed by his adversary, to fall down, and fight rolling on the ground.

This was the third gymnastic exercise, and was not introduced till long after the others.

Those who engaged in these exercises were called pancratistæ; which name was also given to such as did not confine themselves to one exercise, but succeeded in several different ones.

PANCRATIUM, SEA DAFFODIL, in botany, a genus of the hexandria-monogynia class of plants, the flower of which consists of six lanceolated petals, and its nectarium is a single, tubular infundibuliform petal; the fruit is a roundish triquetrous capsule, formed of three valves, and containing three cells, with numerous globose seeds.

PANCREAS, in anatomy, popularly called the sweet-bread, is a large gland, of a flattish shape and fleshy colour, extended behind the stomach, and reaching from the duodenum transversely towards the spleen. Its length is eight or nine inches; its breadth about two fingers, or two and a half; its thickness about one finger; and its weight about three ounces. In man, the shape of the pancreas very much resembles the tongue of a dog; it is broadest towards the duodenum, and gradually narrower towards the spleen. Its substance is glandulous, and it seems formed by a conglomeration of many glands. It is surrounded with a membrane, which is continuous with the peritonæum: it has arteries from the coeliac and ramus splenicus; and veins also from the splenic vein; its nerves are from the par vagum and the intercostals; and finally it has an excretory duct, which is situated in the middle of the pancreas, where it resembles an empty vein, and is about the thickness of a small straw. This duct terminates in the duodenum,

denum, which it enters obliquely, four or five fingers-breadth below the pylorus, usually at the same orifice with the ductus cholidocus; but sometimes it has a double aperture.

The use of the pancreas is to secrete a peculiar liquor, called the pancreatic juice, which is of a salivose nature, and is carried by the pancreatic duct into the duodenum, where it serves to dilute the chyle, to render it more fluid, and fit to enter the mouths of the lacteals; and, perhaps, to temper and dilute the bile, to change its visciduity, bitterness, colour, &c. and make it mix with the chyle, in order to reduce the several tastes, odours, and properties of the several foods, into one homogeneous one. See the articles CHYLE and BILE.

PANDECTS, in the civil law, collections made by Justinian's order, of five hundred and thirty-four decisions of the ancient lawyers, on so many questions occurring in the civil law; to which that emperor gave the force and authority of law, by an epistle prefixed to them. The pandects consist of fifty books, and make the first part of the body of the civil law. See the article CIVIL LAW.

PANDICULATION, a stretching, or that violent and tensive motion of the solids, which usually accompanies the act of yawning.

PANDORON, in antiquity, a musical instrument, resembling a lute, but with strings of brass; its frets were of copper, and its back flat, like the guitar. See the articles LUTE and GUITAR.

PANEGYRIC, an oration in praise of some extraordinary thing, person, or virtue.

Panegyrics were antiently made in the public and solemn assemblies of the Greeks, either at their games, their feasts, or religious meetings. To render them the more solemn, they used to begin with the praises of the deity, in whose honour the games, &c. were celebrated; then they descended to the praises of the people or country where they were celebrated; then to the princes or magistrates who presided at them; and at length to the champions, especially those who had gained the prize.

Panegyric is ranked among the demonstrative kinds of orations, whereof there are commonly reckoned two kinds, *viz.* the artificial, where every thing is reduced to certain heads; and the other natural, where the order of history is observed.

PANEGYRICUM, in church-history, an ecclesiastical book, used by the greek church, containing the panegyric orations of various authors, on the solemnities of Jesus Christ and the saints.

Among the principal authors of this work are St. Athanasius, Cyrill, Basil, Chrysostom, &c.

PANEL, in law, signifies a schedule, or small roll of parchment, in which is contained the names of the jurors returned by the sheriff, to pass upon trial; so that the impanelling of a jury is no more than the sheriff's entering them upon his panel or roll.

PANEL, or **PANNEL**, in joinery. See the article PANNEL.

PANGONIA, in natural history, the name of a genus of crystal, consisting of such as are composed of many angles. See the article CRYSTAL.

The bodies of this genus are single-pointed, or imperfect crystals, composed of dodecangular or twelve-planed columns, terminated by twelve-planed pyramids, and the whole body, therefore, made up of twenty-four planes. Of this genus there are only three known species.

1. A brownish-white one, with a long pyramid. This is found in Silesia and Bohemia; sometimes in mountains, and sometimes on the sides of rivers, and is esteemed a very valuable crystal. 2. A yellowish-brown one, with a short pyramid. This is often brought over to us under the name of saxon topaz, among the other crystals commonly known by that name. And, 3. A clear colourless one, with a very short pyramid. This is a very valuable crystal, and is produced in the East-Indies, being often brought over among the indian ballast.

PANIC, denotes an ill-grounded terror or fright.

Polyænus fetches the origin of the phrase from Pan, one of the captains of Bacchus, who, with a few men, put a numerous army to rout, by a noise which his soldiers raised in a rocky valley favoured with a great number of echoes; for this stratagem making their numbers appear much greater than it really was, the enemy quitted a very commodious encampment, and fled. Hence, says our author, all ill-grounded fears have been called panics, or panic fears.

PANICLE, in botany, denotes a soft woolly beard, on which the seeds of some plants, as millet, &c. hang.

PANICUM, **PANIC**, in botany, a genus of

of the triandria-digynia class of plants, the flower of which is composed of two sharp-pointed valves, and incloses the seed, which is single and roundish, but somewhat flattened.

Panic-seed is accounted drying, refrigerant, and astringent; and therefore recommended in spitting of blood, and nocturnal pollutions.

PANNAGE, *pannagium*, in law-books, signifies the food that swine feed upon in woods, as mast of beech and acorns; or money taken by the king's agiftors for the privilege of feeding hogs in the king's forest.

PANNEL, or **PANEL**, in law. See the article **PANEL**.

In the scotch law, pannel signifies the prisoner at the bar, or person who takes his trial before the court of justiciary, for some crime.

PANNEL, in joinery, is a tympanum, or square piece of thin wood, sometimes carved, framed, or grooved in a larger piece, between two upright pieces and two cross-pieces.

PANNEL, in masonry, is one of the faces of a hewn stone.

PANNELS of a saddle, are two cushions or bolsters, filled with cow's, deer's, or horse-hair, and placed under the saddle, on each side, to prevent the bows and bands from galling the horse.

PANNICULUS CARNOSUS, in comparative anatomy, a robust fleshy tunic, situated in beasts, between the tunic and the fat; by means of which they can move their skin in whole or part: it is altogether wanting in mankind.

PANNIER, **CORBEIL**, or **BASKET**, in fortification. See **BASKET**.

PANNUS, in medicine, the same with the unguis of the eye. See **UNGUIS**.

PANORPA, the **SCORPION-FLY**, in zoology, a genus of insects, with membranaceous wings, the rostrum or trunk whereof is cylindric and of a horny structure, and there is a weapon of the cheliform kind at the tail; the antennæ are setaceous, black, and composed of no less than thirty articulations; the back is brown; the sides are yellow; and the wings are white.

PANSWICK, a market-town, six miles south of Gloucester.

PANTALOON, a sort of garment, consisting of breeches and stockings all of one piece; said to have been first introduced by the Venetians,

In a theatrical sense, pantaloen denotes a buffoon, who performs grotesque dances; and hence is used, by some, for the habit or dress worn by such persons.

PANTHEA, in antiquity, statues composed of the figures or symbols of several divinities.

PANTHEON, in roman antiquity, a temple of a circular form, dedicated to all the gods: it was built by Agrippa, son-in-law to Augustus; but is now converted into a church, and dedicated to the Virgin and all the martyrs.

PANTHER, *panthera*, in zoology, the female leopard. See **LEOPARD**.

PANTOMIME, in antiquity, a person who imitates all sorts of actions and characters, by mere gestures, without speaking a word.

PANTON-SHOE. See **HORSE-SHOE**.

PANUCO, a city of Mexico, situated at the mouth of a river of the same name, which falls into the gulph of Mexico; west longitude 103° , and north latitude 23° .

PAPA, a town of lower Hungary, subject to the empress-queen: east long. 18° , and north lat. $47^{\circ} 40'$.

PAPAL CROWN. See **CROWN**.

PAPAVER, the **POPPY**, in botany. See the article **POPPY**.

PAPAYA, or **CARICA**, in botany. See the article **CARICA**.

PAPENHEIM, a town of Franconia, in Germany, subject to its own count: east long. 11° , north lat. $48^{\circ} 55'$.

PAPER, *παπυρος*, sheets of a thin matter, made of some vegetable substance.

The materials on which mankind have, in different ages, contrived to write their sentiments, have been extremely various; in the early ages they made use of stones, and tables of wood, wax, ivory, &c. See the article **BOOK**.

Paper, with regard to the manner of making it, and the materials employed therein, is reducible to several kinds; as egyptian paper, made of the rush papyrus; bark-paper, made of the inner rind of several trees; cotton paper; incombustible paper; and european paper, made of linen-rags.

Egyptian paper was principally used among the antients; being made of the papyrus or biblus, a species of rush, which grew on the banks of the Nile: in making it into paper, they began with lopping off the two extremes of the plant, the head and the root; the remaining part, which was

was the stem, they cut lengthwise into two nearly equal parts, and from each of these they stripped the scaly pellicles of which it consisted. The innermost of these pellicles were looked on as the best, and that nearest the rind as the worst: they were therefore kept apart, and made to constitute two different sorts of paper. As the pellicles were taken off, they extended them on a table, laying them over each other transversely, so as that the fibres made right angles; in this state they were glued together by the muddy waters of the Nile; or, when those were not to be had, with paste made of the finest wheat-flour, mixed with hot water and a sprinkling of vinegar. The pellicles were next pressed, to get out the water, then dried, and lastly flattened and smoothed by beating them with a mallet: this was the egyptian paper, which was sometimes farther polished by rubbing it with a glass-ball, or the like.

Bark-paper was only the inner whitish rind, inclosed between the bark and the wood of several trees, as the maple, plane, beech, and elm, but especially the tilia, or linden-tree, which was that mostly used for this purpose. On this, stripped off, flattened, and dried, the ancients wrote books, several of which are said to be still extant.

Chinese paper is of various kinds; some is made of the rinds or barks of trees, especially the mulberry-tree and elm, but chiefly of the bambu and cotton-tree. In fact, almost each province has its several paper. The preparations of paper made of the barks of trees, may be instanced in that of the bambu, which is a tree of the cane or reed-kind. The second skin of the bark, which is soft and white, is ordinarily made use of for paper: this is beat in fair water to a pulp, which they take up in large moulds, so that some sheets are above twelve feet in length: they are completed, by dipping them, sheet by sheet, in alum-water, which serves instead of the size among us, and not only hinders the paper from imbibing the ink, but makes it look as if varnished over. This paper is white, soft, and close, without the least roughness; tho' it cracks more easily than european paper, is very subject to be eaten by the worms, and its thinness makes it liable to be soon worn out.

Cotton-paper is a sort of paper which has been in use upwards of six hundred years.

In the french king's library are manuscripts on this paper, which appear to be of the Xth century; and from the XIIth century, cotton manuscripts are more frequent than parchment ones. Cotton-paper is still made in the East-Indies, by beating cotton-rags to a pulp.

Linen or european paper appears to have been first introduced among us towards the beginning of the XIVth century; but by whom this valuable commodity was invented, is not known. The method of making paper of linen or hempen-rags, is as follows: the linen-rags being carried to the mill, are first sorted; then washed very clean in puncheons, whose sides are grated with strong wires, and the bottoms bored full of holes. After this they are fermented, by laying them in heaps close covered with sacking, till they sweat and rot; which is commonly done in four or five days. When duly fermented, they are twisted into handfuls, cut small, and thrown into oval mortars, made of well-seasoned oak, about half a yard deep, with an iron-plate at bottom, an inch thick, eight inches broad, and thirty long: in the middle is a washing-block, grooved, with five holes in it, and a piece of hair-sieve fastened on the inside: this keeps the hammers from touching it, and prevents any thing going out except the foul water. These mortars are continually supplied with water, by little troughs, from a cistern, fed by buckets fixed to the several floats of a great wheel, which raises the wooden hammers, for pounding the rags in the mortars. When the rags are beaten to a certain degree, called the first stuff, the pulp is removed into boxes, made like corn-chandlers bins, with the bottom-board aslant, and a little separation on the front, for the water to drain away. The pulp of the rags being in, they take away as many of the front-boards as are needful, and press the mass down hard with their hands: the next day they put on another board, and add more pulp, till the box is full; and here it remains mellowing a week, more or less, according to the weather. After this, the stuff is again put into clean mortars, and is beaten afresh, and removed into boxes, as before; in which state it is called the second stuff. The mass is beat a third time, till some of it being mixed with fair water, and brewed to and fro, appears like flour and water, without any lumps

lumps in it; it is then fit for the pit-mortar, where it is perfectly dissolved, and is then carried to the vat, to be formed into sheets of paper. But lately, instead of pounding the rags to a pulp with large hammers, as above, they make use of an engine, which performs the work in much less time. This engine consists of a round solid piece of wood, into which are fastened several long pieces of steel, ground very sharp. This is placed in a large trough with the rags, and a sufficient quantity of water. At the bottom of the trough is a plate with steel bars, ground sharp like the former; and the engine being carried round with prodigious velocity, reduces the rags to a pulp in a very short time. It must be observed, that the motion of the engine causes the water in the trough to circulate, and by that means constantly returns the stuff to the engine. The trough is constantly fed with clean water at one end, while the dirty water from the rags is carried off at the other, thro' a hole, defended with wire-gratings, in order to hinder the pulp from going off with the dirty water.

When the stuff is sufficiently prepared as above, it is carried to the vat, and mixed with a proper quantity of water, which they call priming the vat. The vat is rightly primed, when the liquor has such a proportion of the pulp, as that the mould, on being dipped into it, will just take up enough to make a sheet of paper of the thickness required. The mould is a kind of sieve, exactly of the size of the paper to be made, and about an inch deep, the bottom being formed of fine brass-wire, guarded underneath with sticks, to prevent its bagging down, and to keep it horizontal; and further, to strengthen the bottom, there are large wires placed in parallel lines, at equal distances, which form those lines visible in all white paper, when held up to the light: the mark of the paper is also made in this bottom, by interweaving a large wire in any particular form. This mould the maker dips into the liquor, and gives it a shake as he takes it out, to clear the water from the pulp. He then slides it along a groove to the coucher, who turns out the sheet upon a felt, laid on a plank, and lays another felt on it; and returns the mould to the maker, who by this time has prepared a second sheet, in another mould: and thus they proceed,

laying alternately a sheet and a felt, till they have made six quires of paper, which is called a post; and this they do with such swiftness, that, in many sorts of paper, two men make twenty posts, or more, in a day. A post of paper being made, either the maker or coucher whistles; on which four or five men advance, one of whom draws it under the press, and the rest press it with great force, till all the water is squeezed from it; after which it is separated, sheet by sheet from the felts, and laid regularly one sheet upon another; and having undergone a second pressing, it is hung up to dry. When sufficiently dried, it is taken off the lines, rubbed smooth with the hands, and laid by till sized, which is the next operation. For this they choose a fine temperate day, and having boiled a proper quantity of clean parchment or vellum-shavings, in water, till it comes to a size; they prepare a fine cloth, on which they strew a due proportion of white vitriol and roch-alum, finely powdered, and strain the size through it, into a large tub; in which they dip as much paper at once as they can conveniently hold, and with a quick motion give every sheet its share of the size, which must be as hot as the hand can well bear it. After this, the paper is pressed, hung up sheet by sheet to dry; and being taken down, is sorted, and what is only fit for outside-quires, laid by themselves: it is then told into quires, which are folded and pressed. The broken sheets are commonly put together, and two of the worst quires are placed on the outside of every ream or bundle; and being tied up in wrappers, made of the settling of the vat, it is fit for sale.

Paper is of various kinds, and used for various purposes: with regard to colour, it is principally distinguished into white, blue, and brown; and with regard to its dimensions, into atlas, elephant, imperial, super-royal, royal, medium, demy, crown, fool's cap, and pot paper.

As english paper is, in general, as good as any we receive from abroad, a very high duty is laid on the importation of all foreign paper, which is more or less, according to the size, the value, and the country from whence it is brought; thus royal atlas fine, and fine imperial paper, pay 1l. 9s. 8 $\frac{3}{4}$ d. the ream; fine genoa and dutch royal pay 17s. 8 $\frac{3}{4}$ d. the ream; genoa and german crown and fool's cap paper pay about 2s. 7d. and genoa
pot

pot pays 2s. 2½ d. and for every 20s. value, according to the book of rates, of paper brought from Rochelle, 6s. No drawback is allowed on foreign paper exported.

Blotting PAPER, is paper not sized, and into which ink readily sinks: it is used in books, &c. instead of sand, to prevent blotting; and also by apothecaries for filtering.

Teint, or Demi-teint-PAPER, is a paper used for designing on, and is either blue, brown, or bistered.

Bistered PAPER, is white paper washed over with a sponge dipped in foot-water. Its use is to save the labour of the crayon in places which are to be shadowed the same depth as the tint of this paper: as to the light places, they are made with chalk.

Marbled PAPER. See MARBLING.

PAPER-OFFICE, an office in the palace of Whitehall, in which all the public writings, matters of state and council, proclamations, letters, intelligences, negotiations abroad, and generally all dispatches that pass through the offices of the secretaries of state, are lodged, by way of library.

PAPER-OFFICE is also an office belonging to the court of king's bench. See the article KING'S BENCH.

PAPHLAGONIA, an antient province of the lesser Asia, situated on the Euxine-sea, now part of the province of Amasia, in Turkey.

PAPHOS, once an elegant city at the west end of the island of Cyprus; but the little town of Baffo is now all that remains of it.

PAPILIO, the BUTTERFLY, in zoology, a numerous genus of four-winged insects, of the lepidoptera order, distinguished by clavated antennæ.

The butterflies are so numerous, that authors commonly divide them into classes or subdivisions, according to the number of their legs, some having six, and others only four legs, under each of which are comprehended a multitude of beautiful species, distinguished by the different colours and variegations of their wings.

PAPILIONACEOUS, among botanists, an appellation given to the flowers of certain plants, from their resembling the figure of a butterfly: they consist of four petals, whereof that which covers the others, is called the vexillum; the two petals placed on each side, are called the alæ or the wings; and the lowest pe-

tal is termed the carina, which is often divided into two portions. See plate XXXI. n° 10. and 22.

PAPILLA, the NIPPLE OF THE BREAST, in anatomy. See BREAST.

There are also papillæ of the skin and tongue. See CUTIS and TONGUE.

PAPIO, in zoology, the name used by some authors for those monkeys, called in english baboons. See MONKEY and BABOON.

PAPOUL, or ST. PAPOUL, a town of France, in the province of Languedoc, thirty-two miles south-east of Toulouse.

PAPOUS, or NEW GUINEA, a large continent in the Pacific-ocean, a little south of the equator; situated east of the Spice-islands, in 130° east long. but how far it extends farther to the eastward or southward, is uncertain.

PAPPUS, in botany, a soft downy substance that grows on the seeds of certain plants, as thistles, hawkweed, &c. serving to scatter and buoy them up in the air.

PAPULÆ, a name used, by several authors, for eruptions on the skin of any sort.

PAR, in commerce, signifies any two things equal in value; and in money-affairs, it is so much as a person must give of one kind of specie, to render it just equivalent to a certain quantity of another.

In the exchange of money with foreign countries, the person to whom a bill is payable, is supposed to receive the same value as was paid the drawer by the remitter; but this is not always the case, with respect to the intrinsic value of the coins of different countries, which is owing to the fluctuation in the prices of exchange amongst the several european countries, and the great trading cities. The par, therefore, differs from the course of exchange in this, that the par of exchange shews what other nations should allow in exchange, which is rendered certain and fixed, by the intrinsic value of the several species to be exchanged: but the course shews what they will allow in exchange; which is uncertain and contingent, sometimes more, and sometimes less; and hence the exchange is sometimes above, and sometimes under par. See EXCHANGE.

PAR, in anatomy, a pair of the nerves. See the article NERVES.

PARABLE, a fable, or allegorical instruction, founded on something real or apparent in nature or history, from which a moral is drawn, by comparing it with some-

something in which the people are more immediately concerned: such are the parables of Dives and Lazarus, of the Prodigal Son, of the Ten Virgins, &c.

Kircher derives the use of parables from the Egyptians. Some make a difference between a parable and a fable; but Grotius and others use the two terms promiscuously.

Parables are certainly a most delicate way of impressing disagreeable truths on the mind, and in many cases have the advantage of a more open reproof, and even of formal lessons of morality: thus Nathan made David sensible of his guilt by a parable; and thus our Saviour, in attacking the prejudices of his countrymen, always spoke to them in parables.

PARABOLA, in geometry, a figure arising from the section of a cone, when cut by a plane parallel to one of its sides. See the article CONIC SECTIONS.

To describe a parabola in plano, draw a right line AB (plate CXCII. fig. 1.) and assume a point C without it; then in the same plane with this line and point place a square rule DEF , so that the side DE may be applied to the right line AB , and the other EF turned to the side on which the point C is situated. This done, and the thread FGC , exactly of the length of the side of the rule, EF , being fixed at one end to the extremity of the rule F , and at the other to the point C , if you slide the side of the rule DE along the right line AB , and by means of a pin, G , continually apply the thread to the side of the rule, EF , so as to keep it always stretched as the rule is moved along, the point of this pin will describe a parabola GHO .

Definitions. 1. The right line AB is called the directrix. 2. The point C is the focus of the parabola. 3. All perpendiculars to the directrix, as LK , MO , &c. are called diameters; the points, where these cut the parabola, are called its vertices; the diameter BI , which passes through the focus C , is called the axis of the parabola; and its vertex, H , the principal vertex. 4. A right line, terminated on each side by the parabola, and bisected by a diameter, is called the ordinate applicate, or simply the ordinate, to that diameter. 5. A line equal to four times the segment of any diameter, intercepted between the directrix and the vertex where it cuts the parabola, is called the latus rectum, or pa-

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rameter of that diameter. 6. A right line which touches the parabola only in one point, and being produced on each side falls without it, is a tangent to it in that point.

Prop. I. Any right line, as GE , drawn from any point of the parabola, G , perpendicular to AB , is equal to a line GC drawn from the same point to the focus. This is evident from the description; for the length of the thread FGC being equal to the side of the rule EF , if the part FG , common to both, be taken away, there remains $EG = GC$. Q.E.D.

The reverse of this proposition is equally evident, viz. that if the distance of any point from the focus of a parabola, be equal to the perpendicular drawn from it to the directrix, then shall that point fall in the curve of the parabola.

Prop. II. If from a point of the parabola, D , (*ibid.* fig. 2.) a right line be drawn to the focus, C ; and another, DA , perpendicular to the directrix; then shall the right line DE , which bisects the angle, ADC , contained between them, be a tangent to the parabola in the point D : a line also, as HK , drawn through the vertex of the axis, and perpendicular to it, is a tangent to the parabola in that point.

1. Let any point F be taken in the line DE , and let FA , FC , and AC be joined; also let FG be drawn perpendicular to the directrix. Then, because (by prop. I.) $DA = DC$, DF common to both, and the $\angle FDA = \angle FDC$, FC will be equal to FA ; but $FA > FG$; therefore $FC > FG$, and consequently the point F falls without the parabola: and as the same can be demonstrated of every other point of DE , except D , it follows that DE is a tangent to the parabola in D . Q.E.D.

2. If every point of HK , except H , falls without the parabola, then is HK a tangent in H . To demonstrate this, from any point K draw $KL \perp AB$, and join KC ; then because $KC > CH = HB = KL$, it follows that $KC > KL$, and consequently that the point K falls without the parabola: and as this holds of every other point, except H , it follows that KH is a tangent to the parabola in H . Q.E.D.

Prop. III. Every right line, parallel to a tangent, and terminated on each side by the parabola, is bisected by the diameter passing thro' the point of contact; that is,

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it will be an ordinate to that diameter. For let Ee (*ibid.* fig. 3 and 4.) terminating in the parabola in the points E, e , be parallel to the tangent DK ; and let AD be a diameter passing through the point of contact D , and meeting Ee in L ; then shall $EL = Le$.

Let AD meet the directrix in A , and from the points E, e , let perpendiculars EF, ef , be drawn to the directrix; let CA be drawn, meeting Ee in G ; and on the center E , with the distance EC , let a circle be described, meeting AC again in H , and touching the directrix in F ; and let DC be joined. Then because $DA = DC$, and $\angle ADK = \angle CDK$, it follows (4. 1.) that $DK \perp AC$; wherefore $Ee \perp AC$, and $CG = GH$ (3. 3.); so that $eC = eH$ (4. 1.) and a circle described upon the center e , with the radius eC , must pass through H ; and because $eC = ef$, it must likewise pass through f . Now because Ff is a tangent to both these circles, and AHC cuts them, $\square AF = \square CAH$ (36. 3.) $= \square Af$; therefore $AF = Af$, and FE, AL , and fe are parallel; and consequently $LE = Le$. Q. E. D.

Prop. IV. If from any point of a parabola, D (*ibid.* fig. 5.) a perpendicular, DH , be drawn to a diameter BH , so as to be an ordinate to it; then shall the square of the perpendicular, DH^2 , be equal to the rectangle contained under the absciss HF , and the parameter of the axis, or to four times the rectangle HFB .

1. When the diameter is the axis; let $DH \perp BC$, join DC , and draw $DA \perp AB$, and let F be the vertex of the axis. Then, because $HB = DA = DC$, it follows that $HB^2 = DC^2 = DH^2 + HC^2$. Likewise, because $BF = FC$, $HB^2 = 4\square HFC + HC^2$ (by 8. 2.). Wherefore $DH^2 + HC^2 = 4\square HFB + HC^2$; and $DH^2 = 4\square HFB$; that is, $DH^2 =$ the rectangle contained under the absciss HF , and the parameter of the axis.

2. When the diameter is not the axis: let EN (*ibid.* fig. 3 and 4.) be drawn perpendicular to the diameter AD , and EL an ordinate to it; and let D be the vertex of the diameter.

Then shall $EN^2 =$ to the rectangle contained under the absciss LD , and the parameter of the axis. For let DK be drawn parallel to LE , and consequently a tangent to the parabola in the point D ; and let it meet the axis in K : let $EF \perp AB$ the directrix; and on the center

E , with the radius EF , describe a circle, which will touch the directrix in F , and pass through the focus C : then join AC , which will meet the circle again in H , and the right lines DK, LE , in the points P, G ; and, finally, let LE meet the axis in O .

Now since the angles CPK, CBA are right, and the angle BCP common, the triangles CBA, CPK are equiangular; and $AC : CB$ (or $CK : CP$) $:: OK : GP$; and $AC \times GP = OK \times CB$. Again, because $CA = 2CP$, and $CH = 2CG$, $AH = 2GP$; and consequently the $\square CAH = CA \times 2GP = OK \times 2CB$. But, $EN^2 = FA^2 = \square CAH$; and consequently, $EN^2 = OK \times 2CB =$ the \square contained under the absciss, LD , and the parameter of the axis. Q. E. D.

Hence, 1. The squares of the perpendiculars, drawn from any points of the parabola to any diameters, are to one another as the abscissæ intercepted between the vertices of the diameters and the ordinates applied to them from the same points.

2. The squares of the ordinates, applied to the same diameter, are to each other as the abscissæ between each of them and the vertex of the diameter. For let EL, QR (*ibid.* fig. 3 and 4.) be ordinates to the same diameter DN ; and let EN, QS be perpendiculars to it. Then, on account of the equiangular triangles ELN, QRS , $EL^2 : QR^2 :: EN^2 : QS^2$; that is, as the absciss DL to the absciss DR .

Prop. V. If from any point of a parabola E (*ibid.* fig. 3 and 4.) an ordinate EL be applied to the diameter AD ; then shall the square of EL be equal to the rectangle contained under the absciss DL , and the latus rectum or parameter of that diameter.

For, since $QR = DK$, QR^2 will be equal to $DM^2 + MK^2$; but (by case 1. of prop. 4.) $DM^2 = 4\square MQB$; and because $MQ = QK$, $MK^2 = 4MQ^2$; wherefore $QR^2 = 4\square MQB + 4MQ^2$; that is, to $4\square QMB$. But $MQ = QK = DR$, and $MB = DA$; wherefore $QR^2 = 4\square RDA$; and because QR, EL are ordinates to the diameter AD , QR^2 (by cor. 2. of prop. 4.) $: EL^2 :: RD : LD$; $: 4\square RDA : 4\square LDA$. Therefore $EL^2 = 4\square LDA$, or the rectangle contained under the absciss LD , and

and the parameter of the diameter AD : and from this property, Apollonius called the curve a parabola. Q. E. D.

Prop. VI. If from any point of a parabola, A (*ibid.* fig. 6.) there be drawn an ordinate, AC , to the diameter BC ; and a tangent to the parabola in A , meeting the diameter in D : then shall the segment of the diameter, CD , intercepted between the ordinate and the tangent, be bisected in the vertex of the diameter B . For let BE be drawn parallel to AD , it will be an ordinate to the diameter AE ; and the absciss BC will be equal to the absciss AE , or BD . Q. E. D.

Hence, if AC be an ordinate to BC , and AD be drawn so as to make $BD = DC$, then is AD a tangent to the parabola. Also the segment of the tangent, AD , intercepted between the diameter and point of contact, is bisected by a tangent BG , passing through the vertex of DC .

Cartesian PARABOLA, is a curve of the second order, expressed by the equation $xy = ax^3 + bx^2 + cx + d$, containing four infinite legs, *viz.* two hyperbolic ones, MM , Bm , (plate CXCII. fig. 7.) (AE being the asymptote) tending contrary ways, and two parabolic legs BN , MN joining them, being the sixty-sixth species of lines of the third order, according to Sir Isaac Newton, called by him a trident: it is made use of by Des Cartes, in the third book of his Geometry, for finding the roots of equations of six dimensions by its intersections with a circle. Its most simple equation is $xy = x^3 + a^3$, and the points through which it is to pass, may be easily found by means of a common parabola, whose absciss is $ax^2 + bx + c$, and an hyperbola whose absciss is $\frac{d}{x}$; for y will be equal to the

sum or difference of the correspondent ordinates of this parabola and hyperbola.

Diverging PARABOLA, a name given by Sir Isaac Newton to five different lines of the third order, expressed by the equation $yy = ax^3 + bx^2 + cx + d$.

Quadrature of the PARABOLA. See the article QUADRATURE.

PARABOLAN, *parabolanus*, in antiquity, a kind of gladiator, who rushed upon death. See the article GLADIATOR.

PARABOLIC ASYMPTOTE, in geometry, is used for a parabolic line approaching to a curve, so that they never meet; yet, by producing both indefinitely, their distance from each other be-

comes less than any given line. Mac Laurin observes, that there may be as many different kinds of these asymptotes as there are parabolas of different orders. See PARABOLA and ASYMPTOTE.

When a curve has a common parabola for its asymptote, the ratio of the subtangent to the absciss approaches continually to the ratio of two to one, when the axis of the parabola coincides with the base; but this ratio of the subtangent to the absciss approaches to that of one to two, when the axis is perpendicular to the base. And by observing the limit to which the ratio of the subtangent and absciss approaches, parabolic asymptotes of various kinds may be discovered.

PARABOLIC CONOID, in geometry, a solid generated by the rotation of a parabola about its axis: its solidity is $= \frac{1}{2}$ of that of its circumscribing cylinder.

The circles, conceived to be the elements of this figure, are in arithmetical proportion, decreasing towards the vertex.

A parabolic conoid is to a cylinder of the same base and height, as 1 to 2, and to a cone of the same base and height, as $1 \frac{1}{2}$ to 1. See the article GAUGING.

PARABOLIC CUNEUS, a solid figure formed by multiplying all the DB 's (plate CXCII. fig. 8.) into the DS 's; or, which amounts to the same, on the base APB erect a prism, whose altitude is AS ; this will be a parabolical cuneus, which of necessity will be equal to the parabolical pyramidoid, as the component rectangles in one are severally equal to all the component squares in the other.

PARABOLIC PYRAMIDOID, a solid figure generated by supposing all the squares of the ordinate applicates in the parabola so placed, as that the axis shall pass through all the centers at right angles; in which case, the aggregate of the planes will form the parabolic pyramidoid.

The solidity hereof is had by multiplying the base by half the altitude, the reason of which is obvious; for the component planes being a series of arithmetical proportionals beginning from 0, their sum will be equal to the extremes multiplied by half the number of terms.

PARABOLIC SPACE, the area contained between any entire ordinate as VV (plate CXCII. fig. 9.) and the curve of the incumbent parabola.

The parabolic space is to the rectangle of the semi-ordinate into the absciss, as 2 to 3; to a triangle inscribed on the ordinate as a base, it is as 4 to 3.

Every parabolical and paraboloidical space is to the rectangle of the semiordinate into the absciss, as $rx y(m+r)$ to xy ; that is, as r to $m+r$.

Segment of a PARABOLIC SPACE, is that space included between two ordinates.

PARABOLIC SPINDLE, in gauging; a cask of the second variety is called the middle frustum of a parabolic spindle.

The parabolic spindle is eight-fifteenths of its circumscribing cylinder.

PARABOLOIDES, a name given to parabolas of the higher kind, which are algebraic curves. See the article **CURVE**.

PARACENTESIS, an operation in surgery, commonly called tapping.

In a paracentesis of the abdomen, in order to discharge the water contained in dropical subjects, the best method is to lay the patient on the side of his bed, and to insert the trocar into the lower and lateral part of the cavity of the abdomen, at or about the distance of eight fingers-breadth from the navel, or in the middle of the space between the navel and the angle of the os ilium, and after drawing out the sharp pointed bodkin from the cannula, which is left in the wound, so much of the water may be drawn off at a time as the patient can well bear; and if the patient does not grow faint, the whole quantity may be drawn off at once. In order to keep him from fainting, the surgeon, or his assistant, must press both his hands on each side of the abdomen during the operation; or a broad linnen-swath perforated in the middle, may be put round the abdomen, and gradually drawn tighter till all the water is evacuated; after which a flannel-compress, dipped in spirits of wine, may be placed on the wound, and retained by a tight roller. If the patient can only bear to have a few pounds of water taken at a time, as the wound is but small and almost closes of itself, it may be dressed only with a couple of square compresses, a plaster and bandage; and if his strength will permit, the operation may be repeated the next day on the other side of the abdomen; and so on the third day, about two fingers-breadth from the last perforation: fresh wounds are made, rather than to keep open the first, because wounds kept open in hydropical subjects, are in danger of mortifying.

In a paracentesis of the thorax, to discharge water, blood, matter, or such other preternatural substances as are there

lodged, it is necessary to consider, before the operation, in which side of the thorax the matter is contained, and what part of that cavity is most proper to be perforated. In order to discover the first, the surgeon should learn in which side the patient has before had any pain or inflammation; in what part he perceives the weight and fluctuation of matter; on which side he can lie easier than on the other: for that is usually the side affected; the person not being able to lie on the sound side, because of the weight or pressure of the matter on the mediastinum; and, lastly, he may generally perceive some tumour, or inflammatory heat on the side affected. Having discovered which side of the thorax is to be perforated, the operation may then be safely performed between the second and third of the spurious ribs on the left side, or between the third and fourth on the right side, counting from below upwards, so as to be about five or six fingers-breadth from the spine of the back, and as much below the angle of the scapula. The surgeon having marked the described place with ink, and taken up the integuments between his own fingers and those of an assistant, as in cutting issues, he makes an incision about two inches long, according to the course of the ribs; then cautiously divides the intercostal muscles and pleura by a transverse incision with the scalpel; and having introduced the cannula, the contained humours of the thorax are thereby discharged. During the operation the patient should be retained in an inclined posture, by which means the ribs will be elevated more from each other, and a large space made for the incision; and a sufficient opening being made in the thorax, the finger is then to be introduced, in order to separate the lungs from its adhesions to the pleura, and to make way for the peccant humours. After these are discharged, the orifice of the wound is to be stopped with a piece of soft linen rag rolled up, by which it may be kept open for future discharges; but over the orifice of the wound is to be applied soft lint, fastened with thread, and over that a plaster, compress and bandage. The dressing may afterwards be made once or twice a day, discharging and washing out the matter by injecting a decoction of vulnerary herbs. These injections should be continued till they are observed to re-

turn clean, and unmixed with bloody or purulent matter, which is a sign the parts are healed; on which the convoluted linen-rag and lint may be withdrawn, and the rest of the cure completed, as directed under wounds of the thorax. For the method of performing a paracentesis of the scrotum, see HYDROCELE.

PARACENTRIC MOTION, in astronomy, denotes so much as a revolving planet approaches nearer to, or recedes from, the sun, or center of attraction. Thus $SB - SA = bB$ (plate CXCI. fig. 4.) is the paracentric motion of the planet A.

PARACENTRIC solicitation of gravity, is much the same with the centripetal force; and, in astronomy, is expressed by the line AL (*ibid.*) drawn from the point A parallel to the ray SB, infinitely near SB, till it intersect the tangent BL.

PARACLET, the COMFORTER, a name given to the Holy Ghost. See the article TRINITY.

PARACYNANCHE, or PARASYNANCHE. See the article PARASYNANCHE.

PARADE, the placing any thing to public view, with all its advantages and ornaments.

PARADE, in war, is a place where the troops meet to go upon guard, or any other service.

In a garrison where there are two, three, or more regiments, each have their parade appointed, where they are to meet upon all occasions, especially upon any alarm. And in a camp, all parties, convoys, and detachments have a parading place appointed them at the head of some regiment.

PARADE, in fencing, is the action of parrying or turning off any thrust. See the article PARRYING.

PARADIGM, an example or instance of something said or done.

PARADISE, a term principally used for the garden of Eden, in which Adam and Eve were placed immediately upon their creation.

As to this terrestrial paradise, there have been many enquiries about its situation. It has been placed in the third heaven, in the orb of the moon, in the moon itself, in the middle region of the air, above the earth, under the earth, in the place possessed by the Caspian sea, and under the arctic pole. The learned Huetius places it upon the river that is

produced by the conjunction of the Tigris and Euphrates, now called the river of the Arabs, between this conjunction and the division made by the same river before it falls into the Persian sea. Other geographers have placed it in Armenia, between the sources of the Tigris, the Euphrates, the Araxis, and the Phasis, which they suppose to be the four rivers described by Moses.

The celestial paradise is that place of pure and refined delight, in which the souls of the blessed enjoy everlasting happiness. In this sense it is frequently used in the New Testament: our Saviour tells the penitent thief on the cross, "This day shalt thou be with me in paradise;" and St. Paul speaking of himself in the third person, says, "I knew a man who was caught up into paradise, and heard unspeakable words, which it is not lawful for a man to utter."

Mahomet has promised his followers a paradise of mere sensual delights.

Bird of PARADISE, *paradisæa*, in ornithology, a genus of birds of the order of the picæ, the beak of which is of a cultrato-tubulated form, and acute; the forehead is gibbous, and the two middle feathers are extremely long, and very firm.

Of this genus there are a great many elegant species. 1. The greater bird of paradise, about the size of a black-bird; in which, what may be called the two middle feathers of the tail, spring from the rump, and are only the stems of feathers without the web.

2. The supposed king of the greater birds of paradise; being about the size of a chaffinch, only that the bill is longer, and the legs stronger in proportion: it has a very short tail, from the middle of which spring two rigid stems of feathers, which at the points are beset with a web on one side, and curled.

3. The pyed and crested bird of paradise, with two extraordinary long tail-feathers: it is nearly of the size of the second species.

PARADOX, in philosophy, a proposition seemingly absurd, as being contrary to some received opinion; but yet true in fact.

No science abounds more with paradoxes than geometry: thus, that a right line should continually approach to the hyperbola, and yet never reach it, is a true paradox; and in the same manner, a spiral

spiral may continually approach to a point, and yet not reach it, in any number of revolutions, however great.

PARÆA, ÆSCULAPIUS'S SERPENT, in zoology, a species of coluber, with the scuta of the abdomen one hundred and ninety, and the squamæ of the tail forty-two. See the article **COLUBER**.

PARAGE, in law, an equality of blood or dignity, but especially of land, in the partition of an inheritance between co-heirs. See the article **HEIR**.

PARAGOGE, in grammar, a figure whereby a letter or syllable is added to the end of a word; as *med*, for *me*; *dicier*, for *dici*, &c.

PARAGORICS, or **PAREGORICS**. See the articles **PAREGORICS**.

PARAGOYA, one of the Philippine islands, a little north of Borneo.

PARAGRAPH, in general, denotes a section or division of a chapter, and in references is marked thus ¶.

PARAGUAY, or **LA PLATA**, a province of South America, subject to Spain, lies between 12° and 37° south lat. and between 50° and 75° west long.

The paraguay-tea, so much valued in Peru, Chili, and other parts of South America, is the produce of a shrub, the genus of which is not known: its leaves are said to be like those of sena, and infused in hot-water, yield a tea not unlike that obtained from the oriental kind. See the article **TEA**.

PARAIBA, the most northern province of Brasil, situated on the south-side of the mouth of the river Amazon.

PARALEPSIS, παραλειψις, in rhetoric, the pretence of passing over a thing, and yet mentioning it by the bye.

PARALIPOMENA, παραλειπομενα, in matters of literature, denotes a supplement of things omitted in a preceding work.

The two books of Chronicles, in the canon of the scripture, are often termed paralipomena, as being a kind of supplement to those of Kings. See the articles **CHRONICLES** and **KINGS**.

PARALLACTIC, in general, something relating to the parallax of heavenly bodies. See the article **PARALLAX**.

The parallactic angle of a star, &c. is the difference of the angles CEA , (plate CXCI. fig. 5. n° 1.) BTA , under which its true and apparent distance from the zenith is seen; or, which is the same thing, it is the angle TSE .

The sines of the parallactic angles ALT ,

AST (*ibid.* n° 2.) at the same or equal distances, ZS , from the zenith, are in the reciprocal ratio of the distances TL , and TS , from the center of the earth.

PARALLACTIC MACHINE, that represented in plate CXCI. fig. 6. n° 1. the use of which is to find, at any hour of the day, a star whose declination and right ascension is given. Its construction is thus: upon the frame $ABDC$ stands two pieces of wood KS , OR , placed obliquely; these support a kind of trapezium $S12G$, formed likewise of wood: in the middle of this trapezium is a cylindrical wooden axis, which at one end rests upon the side 12 , and at the other end upon the side SG ; both which are perforated for this purpose. The lower end of this axis coincides with the center of a circle delineated upon the piece 12 , as represented *ibid.* n° 2. this circle is furnished with an index, that moves round it, in proportion as the axis turns. The upper end of the axis is placed between two concave semi-circles N , Q , which may be screwed together in such a manner, as to allow the end of the axis only sufficient room to move: one of these semi-circles is graduated; and this end of the axis sustains the piece of wood XZ , hollowed so as to receive the telescope LL , and with a channel cut in it so as to move upon the axis; the degrees of which movement are marked by an index, that turns round the semi-circle NQ . This axis has, by this means, two motions, one from right to left about the point 3, and the other up and down about the point 4; the former being from east to west, when the machine is properly placed, and the other from south to north.

In order to adjust the machine, the angle formed by the axis and the vertical SV , must be equal to the elevation of the pole at the place where the observation is made: then the machine is to be placed in the situation EF , so that the axis $G3$ may coincide with the meridian of the place. Then the telescope is moved up and down, till the index 4 mark upon the semi-circle 506 the degree of the declination of the star; which ought to be from 0 towards 6, when the declination is southern; and from 0 towards 5, when the declination is northern. Then, by means of the right ascension, find when the star will be on the meridian: and converting the time between noon and the hour given into degrees, this will
give

give the ascensional difference; which must be marked by turning the axis of the machine, till the index 3 stands over the degree of right ascension, which should be from 0 towards 2, when the star is not arrived at the meridian; and from 0 towards 1, when it hath passed the meridian. In this situation of the machine, the center of the telescope will be directed towards the star sought, which may be thus seen even in the day-time.

PARALLAX, *παράλλαξις*, in astronomy, denotes a change of the apparent place of any heavenly body, caused by being seen from different points of view; or it is the difference between the true and apparent distance of any heavenly body from the zenith.

Thus let AB (plate CXCIIL. fig. 7.) by a quadrant of a great circle on the earth's surface, A the place of the spectator, and the point V in the heavens the vertex and zenith. Let VNH represent the starry firmament, AD the sensible horizon, in which suppose the star C to be seen, whose distance from the center of the earth is TC . If this star were observed from the center T , it would appear in the firmament in E , and elevated above the horizon by the arch DE : this point E is called the true place of the phænomenon or star. But an observer viewing it from the surface of the earth at A , will see it at D , which is called its visible or apparent place; and the arch DE , the distance between the true and visible place, is what astronomers call the parallax of the star, or other phænomenon.

If the star rise higher above the horizon to M , its true place visible from the center is P , and its apparent place N ; whence its parallax will be the arch PN , which is less than the arch DE . The horizontal parallax, therefore, is the greatest; and the higher a star rises, the less is its parallax; and if it should come to the vertex or zenith, it would have no parallax at all: for when it is in Q , it is seen both from T and A in the same line TAQ , and there is no difference between its true and apparent or visible place. Again, the farther a star is distant from the earth, so much the less is its parallax: thus the parallax of the star F is only GD , which is less than DE the parallax of C . Hence it is plain, that the parallax is the difference of the distances of a star from the zenith when seen from the center and from the sur-

face of the earth: for the true distance of the star M from the zenith is the arch VP , and its apparent distance VN , the difference between which PN is the parallax.

These distances are measured by the angles VTM , and VAM , but $VAM - VTM = TMA$. For the external angle $VAM = LATM + LAT$, the two inward and opposite angles; so that AMT measures the parallax, and upon that account is itself frequently called the parallax: and this is always the angle under which the semi-diameter of the earth AT , appears to an eye placed in the star; and therefore where this semi-diameter is seen directly, there the parallax is greatest, *viz.* in the horizon. When the star rises higher, the sine of the parallax is always to the sine of the star's distance from the zenith, as the semi-diameter of the earth to the distance of the star from the earth's center: hence if the parallax of a star be known at any one distance from the zenith, we can find its parallax at any other distance.

If we have the distance of a star from the earth, we can easily find its parallax: for on the triangle TAC (*ibid.*) rectangular at A , having the semi-diameter of the earth, and TC the distance of the star, the angle ACT , which is the horizontal parallax, is found by trigonometry; and, on the other hand, if we have this parallax, we can find the distance of the star; since in the same triangle, having AT , and the ACT , the distance TC may be easily found.

Astronomers, therefore, have invented several methods for finding the parallaxes of stars, in order thereby to discover their distances from the earth. However, the fixed stars are so remote as to have no sensible parallax; and even the sun, and all the primary planets, except mars and venus when in perigee, are at so great distances from the earth, that their parallax is too small to be observed. In the moon, indeed, the parallax is found to be very considerable, which in the horizon amounts to a degree or more, and may be found thus: in an eclipse of the moon, observe when both its horns are in the same vertical circle, and at that instant take the altitudes of both horns: the difference of these two altitudes being halved and added to the least, or subtracted from the greatest, gives nearly the visible or apparent altitude of the moon's center; and the true altitude

is nearly equal to the altitude of the center of the shadow at that time. Now we know the altitude of the shadow, because we know the place of the sun in the ecliptic, and its depression under the horizon, which is equal to the altitude of the opposite point of the ecliptic in which is the center of the shadow. And therefore having both the true altitude of the moon and the apparent altitude, the difference of these is the parallax required. But as the parallax of the moon increases as she approaches towards the earth, or the perigæum of her orbit; therefore astronomers have made tables, which shew the horizontal parallax for every degree of its anomaly.

The parallax always diminishes the altitude of a phænomenon, or makes it appear lower than it would do, if viewed from the center of the earth; and this change of the altitude may, according to the different situation of the ecliptic and equator in respect of the horizon of the spectator, cause a change of the latitude, longitude, declination and right ascension of any phænomenon, which is called their parallax. The parallax, therefore, increases the right and oblique ascension; diminishes the descension; diminishes the northern declination and latitude in the eastern part, and increases them in the western; but increases the southern both in the eastern and western part; diminishes the longitude in the western part, and increases it in the eastern. Hence it appears, that the parallax has just opposite effects to refraction. See the article REFRACTION.

Annual PARALLAX, the change of the apparent place of a heavenly body, which is caused by being viewed from the earth in different parts of its orbit round the sun. See the article EARTH.

The annual parallax of all the planets is found very considerable, but that of the fixed stars is imperceptible. See STAR.

PARALLAX, in levelling, denotes the angle contained between the line of the true level, and that of the apparent level.

PARALLEL, in geometry, an appellation given to lines, surfaces, and bodies every where equidistant from each other; and which, though infinitely produced, would never meet: thus the line OP , (plate CXCIV. fig. 1.) is parallel to QR .

Geometricians demonstrate, that if two parallels, OP and QR (*ibid.*) be cut by a transverse line ST in A and B ; 1. The alternate angles x and y are equal. 2.

The external angle z is equal to the internal opposite one y . And, 3. The two internal opposite ones x and z , are also equal to two right angles.

It is shewn on the principles of optics, that if the eye be placed between two parallel lines, they will appear to converge towards a point opposite to the eye. And if they run to such a length, as that the distance between them be but as a point thereto, they will there appear to coincide.

Parallel lines are described by letting fall equal perpendiculars, and drawing lines through the extremes.

PARALLEL PLANES, are such planes as have all the perpendiculars drawn betwixt them equal to each other.

PARALLEL RAYS, in optics, are those which keep at an equal distance from the visible object to the eye, which is supposed to be infinitely remote from the object.

PARALLEL RULER, or **PARALLELISM**, an instrument consisting of two wooden, brass, &c. rulers AB , CD (*ibid.* fig. 4.) equally broad every where; and so joined together by the cross blades EF and GH , as to open to different intervals, accede and recede, and yet still retain their parallelism.

The use of this instrument is obvious; for one of the rulers being applied to RS , and the other withdrawn to a given point V , a right line AB , drawn by its edge through V , is a parallel to RS .

PARALLELS, or **PARALLEL CIRCLES**, in geography, called also parallels, or circles of latitude, are lesser circles of the sphere conceived to be drawn from west to east, through all the points of the meridian, commencing from the equator to which they are parallel, and terminating with the poles.

They are called parallels of latitude, because all places lying under the same parallel, have the same latitude.

PARALLELS of latitude, in astronomy, are lesser circles of the sphere parallel to the ecliptic, imagined to pass through every degree and minute of the colures.

They are represented on the globe by the divisions on the quadrant of altitude, in its motion round the globe, when screwed over the pole of the ecliptic. See the article GLOBE.

PARALLELS of altitude, or **ALMUCANTARS**, are circles parallel to the horizon, imagined to pass through every degree and minute of the meridian between the horizon

horizon and zenith, having their poles in the zenith.

They are represented on the globe by the divisions on the quadrant of altitude, in its motion about the body of the globe, when screwed to the zenith.

PARALLELS of declination, in astronomy, are the same with parallels of latitude in geography.

PARALLEL SPHERE, that situation of the sphere, wherein the equator coincides with the horizon, and the poles with the zenith and nadir. See **SPHERE**.

In this sphere all the parallels of the equator become parallels of the horizon, consequently, no stars ever rise or set, but all turn round in circles parallel to the horizon; and the sun when in the equinoctial, wheels round the horizon the whole day. After his rising to the elevated pole, he never sets for six months; and after his entering again on the other side of the line, never rises for six months longer.

This is the position of the sphere to such as live under the poles, and to whom the sun is never above $23^{\circ} 30'$ high.

PARALLEL SAILING, in navigation, is the sailing under a parallel of latitude. See the article **NAVIGATION**.

PARALLELEPIPED, or **PARALLELOPIPED**, in geometry, a regular solid comprehended under six parallelograms, the opposite ones whereof are similar, parallel, and equal, as in plate CXCIV. fig. 3.

All parallelepipeds, prisms, cylinders, &c. whose bases and heights are equal, are themselves equal.

A diagonal plane divides a parallelepiped into two equal prisms; so that a triangular prism is half a parallelepiped upon the same base, and of the same altitude.

All parallelepipeds, prisms, cylinders, &c. are in a ratio compounded of their bases and altitudes: wherefore, if their bases be equal, they are in proportion to their altitudes; and conversely.

All parallelepipeds, cylinders, cones, &c. are in a triplicate ratio, of their homologous sides, and also of their altitudes.

Equal parallelepipeds, prisms, cones, cylinders, &c. reciprocate their bases and altitudes.

To measure the surface and solidity of a parallelepiped.

Find the areas of the parallelogram, ILMK, LMON, and OMKP (*ibid.*) add these into one sum, and multiply that sum by 2, the factum will be the surface of the parallelepiped.

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If then the base ILMK be multiplied by the altitude MO, the product will be the solidity.

PARALLELISM, the situation or quality whereby any thing is denominated parallel. See the article **PARALLEL**.

PARALLELISM of the earth's axis, in astronomy, that situation of the earth's axis, in its progress through its orbit, whereby it is still directed towards the pole-star; so that if a line be drawn parallel to its axis, while in any one position, the axis, in all other positions, will be always parallel to the same line.

This parallelism is the result of the earth's double motion, *viz.* round the sun, and round its own axis; or its annual and diurnal motion; and to it we owe the vicissitudes of seasons, and the inequality of day and night. See the article **EARTH**.

PARALLELISM of the rows of trees. These are never seen parallel, but always inclining to each other towards the farther extreme. Hence mathematicians have taken occasion to enquire in what lines the trees must be disposed to correct this effect of the perspective, and make the rows still appear parallel. The two rows must be such, as that the unequal intervals of any two opposite or correspondent trees may be seen under equal visual rays.

On this principle, some have shewn that the two rows of trees must be two opposite semi-hyperbolas; but Mr. Varignon, in Mem. de l'Acad. ann. 1717, renders the problem much more general, and requires not only that the visual angles be equal, but to have them increase or decrease in any given ratio, provided the greatest do not exceed a right angle. The eye he requires to be placed in any point, either just at the beginning of the ranges, beyond or on this side.

He supposes the first row to be a right line, and seeks what line the other must be, which he calls the curve of the range: this he finds must be an hyperbola to have the visual angles equal. The straight and hyperbolic rows will be seen parallel to infinity; and if the opposite semi-hyperbola be added, we shall have three rows of trees, the straight one in the middle, and all three parallel.

It is sufficient that this second hyperbola have the same center, its vertex in the same right line, and the same conjugate axis. Thus the two hyperbolas may be of all the different kinds possible, yet all have the same effect.

If it be required to have the trees appear under decreasing angles, the straight row being laid down as before, he shews, that if the decrease be in a certain ratio, the other line must be a parallel straight line. But he goes yet farther, and supposing the first row any curve whatever, he seeks for another that shall make the rows have any effect desired.

PARALLELOGRAM, in geometry, a quadrilateral right-lined figure, whose opposite sides are parallel and equal to each other. It is generated by the equable motion of a right line always parallel to itself. When it has all its four angles right, and only its opposite sides equal, it is called a rectangle or oblong. When the angles are all right, and the sides equal, it is called a square. If all the sides are equal, and the angles unequal, it is called a rhombus or lozenge: and if the sides and angles be unequal, it is called a rhomboides.

Properties of the PARALLELOGRAM. In every parallelogram of what kind soever, as *ABCD* (plate *CXCIV.* fig. 2.) a diagonal *DA* divides it into two equal parts; the angles diagonally opposite *B, C*, and *A, D*, are equal; the opposite angles of the same side *C, D*, and *A, B*, &c. are together equal to two right angles; and each two sides, together, greater than the diagonal.

Two parallelograms *ABCD*, and *ECDF*, on the same or equal base *CD*, and of the same height *AC*, or between the same parallels *AF, CD*, are equal: and hence two triangles *CDA*, and *CDF*, on the same base and of the same height, are also equal. Hence, also, every triangle *CFD* is half a parallelogram *ACDB* upon the same or an equal base *CD*, and of the same altitude, or between the same parallels. Hence, also, a triangle is equal to a parallelogram, having the same base, and half the altitude, or half the base, and the same altitude.

Parallelograms, therefore, are in a given ratio compounded of their bases and altitudes. If then the altitudes be equal, they are as the bases, and conversely.

In similar parallelograms and triangles, the altitudes are proportional to the homologous sides, and the bases are cut proportionably thereby. Hence similar parallelograms and triangles are in a duplicate ratio of their homologous sides; as also of their altitudes, and the seg-

ments of their bases; they are, therefore, as the squares of the sides, altitudes, and homologous segments of the bases.

In every parallelogram, the sum of the squares of the two diagonals is equal to the sum of the squares of the four sides. For if the parallelogram be rectangular, it follows, that the two diagonals are equal; and, consequently, the square of a diagonal, or, which comes to the same thing, the square of the hypotenuse of a right angle, is equal to the squares of the sides.

If the parallelogram be not rectangular, and of consequence the two diagonals be not equal, which is the most general case, the proposition becomes of vast extent; for instance, in the whole theory of compound motions, &c. There are three ways of demonstrating this problem; the first by trigonometry, which requires twenty one operations; the second geometrical and analytical, which requires fifteen. M. de Lagny gives the third method in the *Mem de l'Acad.* which only requires seven.

To find the area of the rectangled PARALLELOGRAM ABCD; find the length of the sides *AB* and *AC*; multiply *AC* supposed = 345 into *AB*, = 123, the produce will be the area of the parallelogram, namely, 11385. Hence, 1. Rectangles are in a ratio compounded of their sides *AC* and *AB*. 2. If, therefore, three lines be continually proportional, the square of the middle one is equal to the rectangle of the two extremes: and, if four lines be proportional, the rectangle under the two extremes is equal to that under the two middle terms.

Other parallelograms, not rectangular, have their areas found by resolving them, by diagonals, into two triangles, and adding the areas of the separate triangles into one sum.

PARALLELOGRAM, or **PARALLELISM**, a machine for the ready reduction of designs; it is the same with the pentagraph. See the article **PENTAGRAPH**.

PARALLELOPIPED. See the article **PARALLELEPIPED**.

PARALLELOPIEDIA, in natural history, the name of a genus of spars, thus called, because regularly of a parallelo-piped form. See the article **SPAR**.

They are pellucid crystalline spars externally of a determinate and regular figure, always found loose, detached, and

and separate from all other bodies, and in form of an oblique paralleliped, with six parallelogram sides and eight solid angles, easily fissile, either in an horizontal or perpendicular direction, being composed of numbers of thin plates, and those of very elegantly and regularly arranged bodies, each of the same form with the whole mass, except that they are thinner in proportion to their horizontal planes; and naturally fall into these and no other figures, on being broken with a slight blow. Of this genus there are four known species. 1. The hard, pellucid, and colourless one, called the island-crystal of authors. See the article ISLAND-CRYSTAL.

2. A dull and whitish kind, found in France, Germany, and England, particularly in the Derbyshire and Yorkshire lead-mines, and about Scarborough. This has the same property with the former, of giving a double refraction; but it is so dull and opaque, that it does not shew it so elegantly. 3. A soft, whitish, and very bright one, found principally in the lead-mines of Yorkshire, and about the sea-shores of that country. And, 4. A dull, hard, and pale-brown one: this is found in the lead mines of the same country, and in some parts of Ireland. All these species have the same power of double refraction with the first, but are too opaque to shew it so beautifully, and often have not transparency enough to make it at all distinguishable.

PARALOGISM, in logic, a false reasoning, or a fault committed in demonstration, when a consequence is drawn from principles that are false; or, though true, are not proved; or when a proposition is passed over that should have been proved by the way.

A paralogism differs from a sophism in this, that the sophism is committed out of design and subtlety, and the paralogism out of mistake and for want of sufficient light and application. See the article **SOPHISM** and **DEMONSTRATION**.

PARALYSIS, the **PALSY**. See the article **PALSY**.

PARALYTIC, a person afflicted with the palsy. See the article **PALSY**.

PARAMECIA, in natural history, a name given to such animalcules as have no visible limbs or tails, and are of an irregularly oblong figure. See the article **ANIMALCULE**.

PARAMESE, in the antient music, the note above the mese, in the greek scale; corresponding to a-la-mire, of Guido's scale. See the article **DIAGRAM**.

PARAMETER, in conic sections, a constant line, otherwise called *latus rectum*. See the articles **ELLIPSIS**, **HYPERBOLA**, and **PARABOLA**.

The parameter is said to be constant, because in the parabola, the rectangle under it and any absciss is always equal to the square of the corresponding semi-ordinate; and in the ellipsis and hyperbola, it is a third proportional to the conjugate and transverse axis.

PARAMOUNT, in law signifies the supreme lord of the fee. See **FEE**.

The lords of those honours or manors that have other manors under them are stiled lords paramount; and the king, by our law is the chief lord of all the lands in England. See **MANOR**.

PARANA, a province of Paraguay, subject to Spain.

PARANETE, in antient music, a chord or note of the greek-scale. See the article **DIAGRAM**.

PARANYMPH, *paranympheus*, among the antients, the person who waited on the bridegroom, and directed the nuptial solemnities; called also *pronubus*, and *auspex*, because the ceremonies began by taking auspicia. As the paranymp officiated only on the part of the bride-groom, a woman called *pronuba*, officiated on the part of the bride.

PARAPET, in fortification, an elevation of earth designed for covering the soldiers from the enemies cannon or small shot. The thickness of the parapet is from eighteen to twenty feet; its height is six feet on the inside, and four or five on the outside. It is raised on the rampart, and has a slope above called the superior talus, and sometimes the glacis of the parapet. The exterior talus of the parapet is the slope facing the country; there is a banquette or two for the soldiers, who defend the parapet to mount upon, that they may the better discover the country, fosse, and counterscarpe, and fire as they find occasion. See **GLACIS**, **TALUS**, **BANQUET**, &c.

Parapet of the covert-way, or corridor, is what covers that way from the sight of the enemy, which renders it the most dangerous place for the besiegers, because of the neighbourhood of the
 13 Z 2 faces,

faces, flanks, and curtains of the place.

PARAPET is also a little wall raised breast high on the banks of bridges, keys, or high buildings, to serve as a stay, and prevent people's falling over.

PARAPHERNALIA, or **PARAPHERNA**, in the civil law, those goods which a wife brings her husband besides her dower, and which are still to remain at her disposal exclusive of her husband, unless there are some provision made to the contrary in the marriage-contract. Some of our english civilians define the paraphernalia to be such goods as a wife challengeth over and above her dower or jointure, after her husband's death, as furniture for her chamber, wearing apparel, and jewels, which are not to be put into the inventory of her husband's goods: and a french civilian calls paraphernalia the moveables, linen, and other female necessaries, which are adjudged to a wife in prejudice of the creditors, when she renounces the succession of her husband.

PARAPHIMOSIS, in medicine, a disorder of the penis, wherein the prepuce is shrunk, and withdrawn behind the glans, so as not to be capable of being brought to cover the same; which generally happens in venereal disorders. See the article **PREPUCE**, &c.

In this case, it is usual for the glans to be not only much tumified, inflamed, and painful from the stricture, but the free circulation of the blood being thereby obstructed, will shortly bring on a mortification. Those are most subject to a paraphimosis who have naturally a short prepuce, and are too intense in their embraces with women, who have very strait passages, particularly virgins. Boys are sometimes afflicted with this disorder, when they lasciviously draw back their prepuce, being extremely narrow, and afterwards causing an erection, it cannot be returned over the glans. But the paraphimosis oftener arises from unclean embraces, for the prepuce being inflamed and tumified by the infectious matter imbibed by it, generally produces this disorder, when it is also naturally short. See the article **GONORRHOEA**, &c.

The cure of a paraphimosis, according to Heister, consists chiefly in returning the contracted prepuce over the naked glans; but as a violent inflammation is usually the chief cause of its being so difficult to return the prepuce in the paraphi-

mosis, it may be first proper to make use of discutient and emollient fomentations or cataplasms, with camphorated spirit of wine before the prepuce is attempted to be drawn over the glans, which being effected, all the other bad symptoms will vanish of course. However some surgeons prefer the use of cold water, because the former remedies often augment the influx of the blood to the parts, and so increase the tumour. But when the penis, scrotum, and lower part of the abdomen, are immersed in cold water, with plentiful bleeding, the tumor generally subsides in a short time: the penis is then to be held between the surgeons two foremost fingers of each hand, and the glans, having been first lubricated with oil or butter, is to be forcibly pressed back with his thumbs, whilst the prepuce is at the same time drawn forward under his fingers, so as to cover the denudated glans; but when the inflammation is not very large, it may be often sufficient only to bathe the parts in warm water, when there is little or no virulency. On the contrary, when the tumefied penis tends to mortify through the violence of the inflammation, or long continuance of the disorder, it will be most adviseable to bleed the patient first in the arm, and then in the vena dorsalis penis, in which last it should be continued till the tumour subsides; and then the prepuce may be drawn over the glans as before: and if a gangrene or incipient mortification in the penis, should actually succeed a paraphimosis, it should be treated as before directed, under the articles **GANGRENE** and **MORTIFICATION**.

Sometimes the prepuce is so much distended with the serous part of the blood, that it appears like a blister raised by fire, or a vesicatory: in this case it may be proper to make a few punctures with a lancet or scalpel to discharge the distending lymph, and after washing the parts in warm wine, the prepuce is to be extended over the glans as before. But to prevent the wounded prepuce from growing to the glans, the patient should frequently draw it backwards and forwards, and wet his glans over with his urine when he makes water, which he should continue till there is no danger of their adhering together: but if, by accident or neglect, there should be such a cohesion of the glans and prepuce, it ought

to be immediately separated by the lancet or a proper scalpel, taking great care not to wound the glans. When all the preceding means prove ineffectual, M. Petit's method of proceeding is to incise the distended or contracted prepuce, by inserting a small and crooked scalpel with the edge outward, and the back towards the glans, and thus he divides the prepuce by incision in three, four, or more places, according as the degree of distention makes it necessary; and after washing the incised parts in warm wine, and reducing the prepuce over the glans covered with a little soft lint, the penis is bound up.

PARAPHRASE, *παράφρασις*, an explanation of some text, in clearer and more ample terms, whereby is supplied what the author might have said or thought on the subject; such are esteemed Erasmus's paraphrase on the New Testament, the Chaldee paraphrase on the pentateuch, &c.

PARAPHRENITIS, in medicine, an inflammation of the diaphragm. See **INFLAMMATION**, and **DIAPHRAGM**.

A paraphrenitis, according to Boerhaave, is attended with a very acute and continual fever; an intolerable inflammatory pain of the part affected, which is extremely augmented by inspiration, coughing, sneezing, repletion of the stomach, a nausea, vomiting, compression of the abdomen in going to stool, or making water. Hence the breathing is thick, short, and suffocating, and performed only by the motion of the thorax. There is also a constant delirium, a drawing in of the hypochondria inwards and upwards, an involuntary laughter, convulsions, and madness.

This disease terminates as in a pleurisy, but is attended with more violent symptoms, and is much more fatal. If the part affected suppurates, the matter will fall into the abdomen, and produce a purulent ascites. See **ASCITES**.

The cure must be attempted in the same manner as a pleurisy. See the article **PLEURISY**.

Emollient clysters are often beneficial.

PARAPHROSYNE, a word used by medical writers to express a delirium, or an alienation of mind in fevers, or from whatever cause.

PARAPLEGIA, or **PARAPLEXIA**, in medicine, a species of paralysis, or palsy, usually succeeding an apoplexy. See the article **PALSY**.

Boerhaave defines it an immobility of all the muscles below the head, that have nerves from the cerebrum and cerebellum; sometimes all sense, as well as motion, are destroyed thereby, and sometimes only one of them is lost; hence the the paraplegia is a general palsy affecting the whole body, the head alone excepted.

PARAPLEXIA, the same with paraplegia. See the preceding article.

PARAPOTAMIA, in the materia medica of the ancients, a word used at first as an epithet of distinction for a kind of oenanthe, from which the oenanthine ointment of the Greeks was made, but afterwards used simply as the name of that plant.

PARASANG, an antient persian measure, different at different times, and in different places; being sometimes thirty, sometimes forty, and sometimes fifty stadia, or furlongs.

PARASCEVE, the sixth day of the last week of Lent, commonly called Good Friday.

PARASELENE, in physiology, a mock moon, a meteor, or phaenomenon, encompassing, or adjacent to, the moon, in form of a luminous ring; wherein are sometimes observed one, sometimes two, apparent images of the moon.

The paraselenes are formed after the same manner as the parhelia, or mock suns. See the article **PARHELIUM**.

PARASITE, *παράσιτος*, among the Greeks, was originally a very reputable title; the parasites being a kind of priests, at least ministers, of the gods, in the same manner as the Epulones were at Rome. They took care of the sacred corn, or the corn destined for the service of the temples, and the gods, viz. sacrifices, feasts, &c. they had even the intendance over sacrifices and took care that they were duly performed. At Athens, there was a kind of college of twelve parasites; each people of Attica furnishing one, who was always chosen out of the best families. Polybius adds, that a parasite was also an honourable title among the antient Gauls, and was given to their poets; but of late it has been made a term of reproach, and used for a flatterer, and mean dependant.

PARASITES, or **PARASITICAL PLANTS**, in botany, such plants as are produced out of the trunk or branches of other plants, from whence they receive their nourishment,

nourishment, and will not grow upon the ground, as the misleto, &c.

PARASOL, a little moveable, in manner of a canopy, borne in the hand, to screen the head from the sun, rain, &c. more usually called umbrella. It is made of leather, taffety, oil-cloth, &c. mounted on a stick, and opened or shut at pleasure, by means of pieces of whalebone that sustain it.

PARASTATA, in the antient architecture, an impost, or kind of anta, or pilaster, built for the support of an arch; or as some will have it, pilasters, which stand alone, not adjoining to the wall. Daviler makes a parastata the same with impost, but Evelyn the same with pilaster.

PARASTATÆ, or **EPIDIDYMIDES**, in anatomy, two tuberos varicose bodies, lying upon, and adhering to, the upper part of the testicles, whereof they properly appear to be a part, though different from the rest in form and consistence.

The parastatæ are oblong, nearly of a cylindric figure, resembling in some measure the body of a caterpillar, or silkworm. They are connected with the testicle by means of the tunica albuginea, and also with the vas deferens. Their origin is in the testicles, by five or six very small seminal vessels, and their termination is in the other extremity of the testicle, where the vas deferens begins. They are surrounded by a robust membrane, which is continuous with the albuginea of the testicle; they are composed of vessels in the same manner as the testicles, which are capable of being elegantly filled with injections. All these vessels terminate in one duct at last, and this duct is called the vas deferens: the vessels they are composed of are much more conspicuous than those which form the testicles: their blood-vessels being the same with those of the testicles, are called spermatics; their nerves proceed from the same branches with those of the testicles; their use is to receive the semen from the testicles, to farther elaborate and perfect it, and finally to convey it into the vas deferens. See the article **DEFERENTIA VASA**, &c.

PARASYNANCHE, in medicine, a kind of angina, or quinzý, wherein the exterior muscles of the throat are inflamed. See the article **QUINZY**.

PARATHENAR, in anatomy, the name of two muscles of the foot; one of which, the parathenar major, is a pretty

long muscle, forming a part of the outer edge of the sole of the foot. It is fixed backward by a fleshy body to the outer part of the lower side of the os calcis, from the small posterior external tuberosity all the way to the anterior tuberosity: there it joins the metatarsus, and at the basis of the fifth metatarsal bone separates from it again, and forms a tendon which is inserted in the outside of the first phalanx of the little toe, near its basis, and near the insertion of the other parathenar: this last is called the parathenar minor; being a fleshy muscle fixed along the posterior half of the fifth bone of the metatarsus, and terminating under the head of that bone in a tendon which is inserted in the lower part of the basis of the first phalanx of the little toe.

PARATHESIS, in grammar, the same with apposition. See **APPOSITION**.

PARATHESIS, is also the same with parenthesis. See **PARENTHESIS**.

PARATHESIS, in the greek church, the prayer which the bishop rehearses over the catechumens, stretching his hand over them to give them benediction, which they receive bowing their heads under his hands.

PARATITLES, *paratitla*, in jurisprudence, short notes or summaries of the titles of the digest and code; which have been made by several lawyers, in order to compare and examine the connection of the several parts with one another. See **DIGEST** and **CODE**.

PARAVAIL, or **PARAVAILLE**, signifies a person that is tenant to one who holds of another, or the lowest tenant of the fee.

PARAZONIUM, or **SCIPIO**, among medalists, a sceptre, rounded at the two ends in manner of a truncheon, or commander's staff; or a kind of poniard or short sword, represented as worn at the girdle on several antient medals.

Antiquaries are much divided on the explication of the parazonium; on account that the form and manner of bearing it are very different. It is sometimes thrown across the shoulders in manner of a quiver.

PARBOILING, in pharmacy, &c. a term applied to fruits, herbs, &c. which are boiled a little while, to draw out the first juices, in order to be afterwards inspissated or thickened. See **BOILING**.

PARBUNCLE, in a ship, the name of a rope almost like a pair of slings: it is seized both ends together, and then put double

double about any heavy thing that is to be hoisted in or out of the ship; having the hook of the runner hitched into it, to hoise it up by.

PARCÆ, in the heathen mythology, goddesses, who were supposed to preside over the accidents and events, and to determine the date or period, of human life.

The antients reckoned the parcæ, who were also called fates and destinies, to be three in number, because all things have their beginning, progress and end. They were called Atropos, Clotho, and Lachesis, and are represented as spinning the thread of human life, in which employment Clotho held the distaff. Lachesis turned the wheel, and Atropos cut the thread. Their persons are variously described; sometimes they are represented as old women, one holding a distaff, another a wheel, and a third a pair of scissars. Others paint Clotho in a robe of divers colours, with a crown of stars upon her head, and holding a distaff in her hand; Lachesis in a garment covered with stars, and holding several spindles; and Atropos they clad in black, cutting the thread with a large pair of scissars.

PARCEL-MAKERS, two officers in the exchequer, who make parcels of the excheator's accounts, in which they charge them with every thing they have levied for the king's use, within the time of their office, and deliver the same to one of the auditors of the court, to make their accounts therewith.

PARCHMENT, in commerce, the skins of sheep or goats prepared after such a manner as to render it proper for writing upon, covering books, &c.

The manufacture of parchment is begun by the skinner, and finished by the parchment-maker.

The skin having been stripped of its wool, and placed in the lime-pit, in the manner described under the article SHAMMY, the skinner stretches it on a kind of frame, and pares off the flesh with an iron instrument; this done, it is moistened with a rag, and powdered chalk being spread over it, the skinner takes a large pumice-stone, flat at bottom, and rubs over the skin, and thus scowers off the flesh; he then goes over it again with the iron instrument, moistens it as before, and rubs it again with the pumice-stone without any chalk underneath: this smooths and softens the flesh side very considerably. He then

drains it again, by passing over it the iron instrument as before. The flesh side being thus drained, by scraping off the moisture, he in the same manner passes the iron over the wool or hair-side: then stretches it tight on a frame, and scrapes the flesh-side again: this finishes its draining; and the more it is drained, the whiter it becomes. The skinner now throws on more chalk, sweeping it over with a piece of lamb-skin that has the wool on, and this smooths it still farther. It is now left to dry, and when dried, taken off the frame by cutting it all round. The skin thus far prepared by the skinner, is taken out of his hands by the parchment-maker, who first, while it is dry, pares it on a summer, (which is a calf skin stretched in a frame) with a sharper instrument than that used by the skinner, and working with the arm from the top to the bottom of the skin, takes away about one half of its thickness. The skin thus equally pared on the flesh side, is again rendered smooth, by being rubbed with the pumice stone, on a bench covered with a sack stuffed with flocks, which leaves the parchment in a condition fit for writing upon. The parings thus taken off the leather, are used in making glue, size, &c. See the article GLUE, &c.

What is called vellum, is only parchment made of the skins of abortives, or at least sucking calves. This has a much finer grain, and is whiter and smoother than parchment; but is prepared in the same manner, except its not being passed through the lime-pit.

Parchment on being imported, pays a duty of 1 l. 5 s. $\frac{64\frac{1}{2}}{100}$ d. for every roll,

containing six dozen, of which 9 s. $\frac{67\frac{1}{2}}{100}$ d.

is drawn back on exportation.

PARCO FRACTO, in law, is a writ which lies against a person that breaks any pound, and takes out from thence beasts lawfully impounded. On this writ damages are recoverable, and the party offending may be punished, as for a pound-breach in the court-leet.

PARDALUS, or **PARDUS**, the leopard. See the article LEOPARD.

PARDO, a fine palace belonging to the king of Spain, with a fine park and gardens, about six miles north-west of Madrid.

PARDON, in law, is the forgiveness of an

an offence against the king or the laws. A pardon may be granted either before attainder or conviction, or afterwards, and they are also sometimes granted upon conditions, on the performance of which the validity of the pardon depends. Pardons are general, and either by act of parliament, or by the king's charter granted upon some public occasion, as a coronation, &c. or particular, when granted by the king to particular persons. As to a general pardon, it not only discharges the punishment to which the offender was liable, but also the guilt of the crime itself; and some lawyers maintain, that it pardons the crime so fully, that the offender in the eye of the law is deemed as innocent as if he had never committed it. For this reason, after the pardon, a person, on being called felon or traitor, may have an action for scandal; and he may be a good witness, notwithstanding his conviction or attainder, because the pardon makes such a person a new man, and gives him fresh credit. But though a general pardon extends to public offences against the commonwealth, it does not extend to private injuries committed against particular persons, and therefore, he that would reap the benefit of such a pardon must plead the statute, &c. by which it was granted, in order that the court may judge whether his offence be included within the statute or not; likewise where there is an exception in the pardon, he must shew that he is not the person excepted against. Neither can the king's charter of pardon be allowed, unless it be pleaded and produced in court; where the party at the bar must, upon his knees, pray the allowance of it. No pardon of felony, &c. can pass without warrant of the privy seal, and those who have been guilty of felony, notwithstanding their pardon, are to enter into a recognizance with two sufficient sureties for their good behaviour for seven years. In what cases, on the discovery of accomplices, pardons are allowed by statute may be seen in 4 and 5 William and Mary, and 11 William III.

PAREGORICS, in pharmacy, medicines that assuage pain, otherwise called anodynes. See the article **ANODYNE**.

PAIREIRA BRAVA, in the materia medica, a kind of oblong, and large root, brought from the Brasils; but the plant, to which it belongs, is not known.

It is certainly a diuretic of no mean character, and has done great service in nephritic cases, and in pleuritis and quinies it has been attended with more success than almost any medicine we know of singly. In suppressions of urine, scarce any thing is more efficacious or more instantaneous in its effects; but it is a folly to infer from this, that it will dissolve the stone. This medicine dissolves the mucous humour that stops up the passages of the kidneys, &c. and expels all the stony matter not yet formed into large and hard masses. And in cases of ulceration of the kidneys and bladder, after the use of this remedy, the urine flows copiously and becomes more limpid, and the ulcerations are soon healed upon giving a little balsam capivi mixed with it.

Geoffroy, who highly commends the *pareira brava*, adds that in humoral asthmas arising from a glutinous phlegm obstructing the bronchia, after all other methods tried in vain, this root has promoted an expectoration; and the same success he has had with it in a jaundice arising from a thick and grumous state of the bile; he also recommends it greatly in gonorrhœas, mixed with balsam capivi, given in powder and made into a bolus; or, with that and calomel, with some thick syrup. Two drachms of it will serve for a decoction to be taken at about three doses.

Besides the true *pareira brava*, there is another called the *pareira brava alba*; it is said, by the Portuguese, to possess the same virtues with the former, but in a more remiss degree.

PARELCON, in grammar, a figure by which a word or syllable is added to the end of another.

PARELIUM, or **PARHELIUM**. See the article **PARHELIUM**.

PAREMBOLE, *παρεμβολη*, in rhetoric, a figure wherein something relating to the subject is inserted in the middle of a period. All the differences between the *parembole* and *parenthesis*, according to Vossius, is, that the former relates to the subject in hand, whereas the latter is foreign to it. An example of each we have in Virgil; and first of the *parembole*.

Æneas (neque enim patrius consistere mentem

Passus amor) rapidum ad naves præmittit Achatem.

The

The following is an instance of the parenthesis:

*— ipſique ſuos jam morte ſub ægrâ
(Di meliora piis, erroremque hoſtibus
illum)*

Diſciſſos nudis laniabant dentibus artus.

See the article PARENTHESIS.

PARENCHYMA, in anatomy, a term introduced by Eraſiſtratus, ſignifying all that ſubſtance which is contained in the interſtices betwixt the blood-veſſels of the viſcera, which he imagined to be extra-vaſated and concreted blood. The moderns having diſcovered all the viſcera to be vaſculary and glandulous, have rejected this term, together with the doctrine.

PARENCHYMA of plants. Grew applies the term parenchyma to the pith or pulp, or that inner part of a fruit or plant through which the juice is ſuppoſed to be diſtributed. This, when viewed with a microſcope, appears to reſemble marrow, or rather a ſponge, being a porous, flexible, dilatable ſubſtance. Its pores are innumerable and exceedingly ſmall, receiving as much humour as is requiſite to fill and extend them, which diſpoſition of pores it is that is ſuppoſed to fit the plant for vegetation and growth.

PARENT, *parens*, a term of relation applicable to thoſe from whom we immediately receive our being. See the articles FATHER and MOTHER.

Parents, by the law of nature, are bound to educate, maintain, and defend their children, over whom they have power by that law: they likewiſe have intereſt in the profits of their children's labour, during their nonage, in caſe the children live with and are provided for by them: yet the parent has no intereſt in the real or perſonal eſtate of a child, any otherwiſe than as his guardian.

PARENTALIA, in antiquity, funeral obſequies, or the laſt duties paid by children to their deceased parents.

It is alſo uſed for a ſacrifice, or ſolemn ſervice, offered annually to the manes of the dead.

PARENTELA. *De parentela ſe tollere*, was antiently uſed among us to denote a perſon's renouncing his kindred or family.

This was performed in open court before the judge, in the preſence of twelve men, who made oath that they believed it was done on good grounds.

PARENTHESIS, in grammar, certain intercalary words, inſerted in a diſcourſe,

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which interrupt the ſenſe, or thread, but ſeem neceſſary for the better underſtanding of the ſubject.

The proper characteristic of a parenthesis is, that it may be either taken in or left out, the ſenſe and the grammar remaining intire. In ſpeaking, the parenthesis is to be pronounced in a different tone; and in writing, it is enclosed between (), called alſo a parenthesis, but commonly a bracket, or crochet, to diſtinguiſh it from the reſt of the diſcourſe. The politeſt of our modern writers avoid all parentheses, as keeping the mind in ſuſpenſe, embarraſſing it, and rendering the diſcourſe leſs clear, uniform, and agreeable.

The parenthesis is frequently confounded with the parembolè. See the article PAREMBOLE.

PARENZO, or **PIRENZO**, a port-town of Iſtria, in the territory of Venice, ſituated on a bay of the gulph of Venice, twenty-five miles ſouth of Cabo de Iſtria.

PARERGA, *παρεργα*, a term ſometimes uſed in architecture for additions or appendages made, by way of ornament, to a principal work.

It is ſometimes uſed in painting for little pieces or compartments, on the ſides or in the corners of the principal piece.

PARESIS, *παρεσις*, in medicine, is defined to be a palsy of the bladder, wherein the urine is either ſuppreſſed or diſcharged involuntarily. See PALSY.

PARETONIUM, in natural hiſtory, the name of an earth antiently found on the ſhores of Egypt, Cyrene, and the iſland of Crete, and uſed by the antients in painting. There has been ſome difference among the earlier writers about the nature and origin of this ſubſtance, and of late we have been taught to think it loſt; but it is ſtill common on the ſhores of moſt of the iſlands of the Archipelago, though not obſerved or regarded; and is truly a very heavy and tough clay, of a fine white colour, found in maſſes of different ſizes, generally as ſoft as the ſofter clays within the ſtrata; and by rolling about on the beech in this ſtate, it gathers up the ſand, ſmall ſhells, and other foulneſſes we always find about it. It is moſt probable, that there are ſtrata of it fine and pure in the cliffs there, and that the ſea waſhes off maſſes of them in ſtorms and high tides, which are what we find.

PARGET, in natural hiſtory, a name given

given to several kinds of gypsum, or plaster stone. See PLASTER.

PARGETING, in building, is used for the plastering of walls, and sometimes for the plaster itself.

Pargeting is of various kinds, as, 1. white-lime, hair, and mortar, laid upon bare walls: 2. on bare laths, as in partitioning and ceiling: 3. rendering the insides of walls, or doubling partition-walls: 4. rough-casting upon heart-laths: 5. plastering on brick-work, with a finishing mortar, in imitation of stone work.

PARHELIUM, or **PARHELION**, in physiology, a mock sun, or meteor, in form of a very bright light, appearing on one side of the sun.

The parhelia are formed by the reflection of the sun's beams on a cloud properly posited. They usually accompany the coronæ, or luminous circles, and are placed in the same circumference and at the same height. Their colours resemble that of the rainbow, the red and yellow are on the side towards the sun, and the blue and violet on the other. There are coronæ sometimes seen without parhelia, and *vice versa*.

Parhelia are double, triple, &c. and in 1629, a parhelion of five suns was seen at Rome; and in 1666, another at Arles of six.

M. Mariotte accounts for parhelia from an infinity of little particles of ice floating in the air, that multiply the image of the sun by refraction or reflection; and by a geometrical calculus he has determined the precise figure of these little icicles, their situation in the air, and the size of the coronæ of circles which accompany the parhelia, and the colours wherewith they are painted. M. Huygens accounts for the formation of a parhelion in the same manner as for that of the halo. See the article HALO.

PARIA, a lake of Peru, in south America, in the province of Los Charcas, situated in 67° west long. and 22° south lat.

PARIA, or **NEW-ANDALUSIA**, a country of Terra-Firma, in south-America, having the Atlantic-Ocean on the north; the country of Guiana, from which it is separated by the river Oronoque, on the east; and Venezuela on the west.

PARIAN-MARBLE. See MARBLE.

PARIETALIA OSSA, in anatomy, the second and third bones of the cranium;

being called also ossa-bregmatis, and ossa-sincipitis.

These bones are of a larger extent than any of the other bones of the skull: their figure is nearly that of an irregular convex square; they have each an external convex side, and an internal and concave one; four edges, one superior or sagittal, one inferior or temporal, one anterior or frontal, and one posterior or occipital. In the external surface of the parietals, is the place of part of the temporal muscle or *crotophytes*. In their internal surface are furrows representing little shrubs; these are formed by the arteries of the dura mater: besides these there are other foveæ.

PARIETES, in anatomy, a term used for the inclosures, or membranes, that stop up or close the hollow parts of the body, especially those of the heart, thorax, &c.

PARIETARIA, **PELLITORY OF THE WALL**, in botany, a genus of the polygamia-monoecia class of plants, having no corolla: the stamina are four subulated filaments; the antheræ are didymous; there is no pericarpium; the perianthium is elongated, very large, and campanulated; the seed is single and roundish. This plant is very famous in the materia medica, as cooling and abstergent. It is prescribed in stranguries, and in cases of gravel, or small stones in the kidneys, and is an ingredient in decoctions for clysters to be given in nephritic cases. Externally, it is much recommended in the erysipelas, and for the softening of hard tumours.

PARIS, **HERB TRUE-LOVE**, in botany, a genus of the octandria-trigynia class of plants, the corolla whereof consists of four oblong, plane, patent petals; the fruit is a berry of a globose, tetragonal form, containing four cells, and standing in the cup: the seeds are numerous, and arranged in a double series.

PARIS, in geography, the metropolis of the kingdom of France, and of the principality or government of the isle of France, situated in east long. 2° 25', north lat. 48° 50', two hundred miles south-east of London, six hundred and eighty north-east of Madrid, five hundred and fifty west of Vienna, one thousand three hundred north-west of Constantinople, and seven hundred north-west of Rome.

Paris is usually divided into three parts: 1. the town, which is the largest, situated on

on the north side of the river Seyne: 2. the city, much the least, but the most antient, consisting of three little islands in the middle of the Seyne: 3. the university, which lies on the south side of the river. The whole town is of a circular form, six leagues in circumference, and the diameter three, and containing seven hundred thousand inhabitants.

PARISH, the precinct of a parochial church, or a circuit of ground inhabited by people who belong to one church, and are under the particular charge of its minister.

A parish may contain several villages within its limits, though in general it is accounted to contain no more than one, except the contrary be made to appear: and an antient village, which time out of mind has had a church of its own, and chosen overseers, &c. may be a parish in reputation, so as to provide for its own poor only, and be excused from contributing to the poor of the parish in which it lies, 43 Eliz. c. 2.

In England there are nine thousand, nine hundred and thirteen parishes, of which three thousand, eight hundred and forty-five are churches impropriate, and the rest are annexed to colleges, or church dignities. In many of these parishes, on account of their large extent, and the number of parishioners, there are several chapels of ease.

PARISH-OFFICERS, officers chosen annually to regulate and manage the concerns of the parish, for which see the articles **CHURCH-WARDENS** and **OVERSEERS of the poor**.

PARISIS, an epithet formerly given to the money struck at Paris, to distinguish it from the coin called *tournois*, which was at the same time struck at Tours. The paris is exceeded the *tournois* by one fourth, so that the sol paris was worth fifteen deniers, and the sol-*tournois* but twelve.

PARK, a large inclosure privileged for wild beasts of chase, either by prescription or the king's grant. No person can now erect a park without his obtaining first a licence under the broad-seal; but there may be such in reputation, though erected without lawful warrant, and the owner may bring his action against persons that kill his deer therein. The pulling down walls, or pales, makes the offenders liable to the same penalty as for killing of deer.

PARK, is also used for a moveable inclosure,

or fold, set up in the fields for sheep to feed and rest in during the night. This park is frequently removed by the shepherds to dung the ground one part after another.

PARK, also signifies a large net, placed on the brink of the sea, with only one entrance, which is next the shore, and which is left dry by the ebb of the tide; so that the fish once got in have no way left to escape.

PARK of artillery. See the article **ARTILLERY PARK**.

PARK-ABBY, a place near Louvain, in the Netherlands, which being an excellent situation for a camp, was frequently possessed by the armies in the late war.

PARKINSONIA, in botany, a genus of the decandria monogynia class of plants, the corolla of which consists of five petals; nearly equal in size: the fruit is an oblong legume, nodose at the seeds, and acuminate: the seeds are numerous.

PARLEY, a conference with an enemy. Hence to beat or sound a parley, is to give a signal for holding such a conference by beat of drum or sound of trumpet.

PARLIAMENT, is the grand assembly of the three states of this kingdom, summoned together, by the king's authority, to consult of matters relating to the public welfare, and particularly to enact and repeal laws. It consists of the king, the lords spiritual and temporal, and the commons, and is at once the seat of the legislative authority, and the highest court of justice in Great-Britain. In the house of lords, criminal causes are tried on the impeachment of the commons; and this house has an original jurisdiction for the trial of peers upon indictments found by a grand jury; the lords likewise try such causes as come thither on appeals from the court of chancery, and all their decrees are as judgments. The house of commons examine the right of elections, regulate disputes concerning them, may expel their own members, and commit them to prison; they are the grand inquest of the nation, and present public grievances or delinquents to the king and lords, in order to their being punished. In short, they are the representatives of all the commons in the kingdom, and in them their constituents have placed the highest confidence, by investing them with the power of making laws, and entrusting them with all their liberties and privileges. Originally, new parliaments were called

every year; but by degrees their term grew longer. In the reign of king Charles II. they were held a long time, with great interruptions between: but both methods were found of such ill consequence, that, in the beginning of the reign of king William III. an act was passed, by which the term of all parliaments was restrained to three sessions, or three years; this was hence called the triennial act: but since that time, from other views, the period of parliaments has been lengthened to seven years. A parliament is called by the king's writ or letter directed to each lord, commanding him to appear; and by other writs, directed to the sheriffs of each county, to summon the people to elect two knights for each county, and one or two burgesses for each borough. The number of the members in the house of lords is uncertain, as encreasing at the king's pleasure. The members of the house of commons, when full, are five hundred and fifty-three; *viz.* ninety-two knights of the shires; fifty-two deputies for twenty-five cities, London having four; sixteen for the eight cinque-ports; two for each university; three hundred and thirty-two for an hundred and eighty boroughs; twelve for the boroughs in Wales, and forty-five members for Scotland. If three hundred of these members are met, it is reckoned a full house; and forty may compose a house for the dispatch of business.

Upon the holding of a parliament, the king, the first day, sits in the upper-house, under a canopy, with the crown on his head, and dressed in his royal robes; and there, by himself, or the lord chancellor, declares the reasons of their meeting, in the presence of both the lords and commons, and then the commons are required to choose a speaker, who is presented to the king, and being approved by his majesty, the business of the parliament goes on.

The lords and commons sit each in a distinct apartment: in the house of lords, the princes of the blood sit by themselves on the sides of the throne; at the wall, on the king's right hand, the two archbishops sit by themselves on a form. Below them, the bishops of London, Durham and Winchester, and all the other bishops sit according to the priority of their consecration. On the king's left hand, the lord-treasurer, lord president, and lord-privy-seal sit upon forms above

all dukes, except the royal blood; then the dukes, marquesses, and earls, according to their creation. Across the room are wool-sacks, continued from an antient custom; and the chancellor, or keeper, being of course the speaker of the house of lords, sits on the first wool-sack before the throne, with the great seal or mace lying by him; below these are forms for the viscounts and barons. On the other wool-sacks are seated the judges, masters in chancery, and king's council, who are only to give their advice in points of law; but they all stand up till the king gives them leave to sit. The commons sit promiscuously, only the speaker has a chair at the upper end of the house, and the clerk and his assistant sit at a table near him. Before any business is done, all the members of the house of commons take the oaths of allegiance and supremacy, &c. and subscribe their opinions against transubstantiation, &c. and if any member of that house votes, or sits there during any debate, after the speaker is chosen, without having first taken these oaths, between the hours of nine and four, in a full house, he is adjudged a popish recusant convict, and incapable of any office, and forfeits five hundred pounds. The same test the lords too, though they do not take the oaths, are obliged to comply with. When the parliament is thus met, no members are to depart from it without leave. Upon extraordinary occasions, all the members are sometimes summoned, in which case every lord spiritual and temporal, and every knight, citizen, and burgess is to come to parliament, except he can reasonably and honestly excuse himself; or be amerced: that is, respectively, a lord by the lords, and a commoner by the commons.

All members of parliament, in order that they may attend the public service of their country, have the privilege for themselves and their menial servants, of being free from arrests, attachments, imprisonments, &c. for debts, trespasses, &c. but not from arrests for treason, felony, and breach of the peace: however, it is ordained by statute, that actions may be commenced, in any of the courts of Westminster, against persons intitled to privilege of parliament, after a prorogation or dissolution, till a new parliament is called, or the same become re-assembled; and likewise after an adjournment for above fourteen days; and the respective courts, in such a case, have power to proceed

proceed to judgment, &c. here the process is to be summons, distress infinite, &c. till the parties shall enter an appearance; and for default thereof, the real or personal estate of the defendant may be sequestered; though the plaintiff may not, in that case, arrest the body of any member of parliament: 12 W. III. c. 3. As to the election of members, it is enacted that candidates shall not make any presents of money to, or treat the electors, after the teste of the writ of the summons, or the issuing out of the writs for elections, or after any seat for a member of parliament is become vacant; in case they do, they are declared incapable of serving as members, by 7 W. III. c. 4. And farther, an oath is to be taken by electors, that they have not either received, or had any money, gift, reward, or any office, place, employment, or even promise of money, gift, &c. to them or their use, to give their votes; and in these cases, if they ask, take, or contract for money or reward, either by gift or other device, to give or refuse their votes for any one; or if persons, by gift, &c. corruptly procure any elector to give his vote, they shall forfeit five hundred pounds, and be totally disabled to vote at any election of members of parliament, as also to hold any office, franchise, &c. Likewise officers who admit persons to vote without their taking the aforementioned oath, in case the same be demanded, incur a forfeiture of one hundred pounds; and an oath is to be administered to all the returning officers, that they have not received any money, gift, or place, for the making of their returns: 2 Geo. II. c. 24. 9 Geo. II. c. 38. A knight of the shire must be worth six hundred pounds a year in land, and all other members three hundred pounds.

Antiently all the people had votes in elections, till it was enacted by Henry VI. that none but freeholders, who had a yearly revenue of forty shillings, should be admitted to vote for knights of the shire.

The manner of debating upon, and passing bills in parliament, is as follows: any member may move to have a bill brought in, which, upon a question put, being agreed to by the majority, this person, with others, is ordered to prepare and bring in the same. When it is ready, a time is appointed for its being read, and after the clerk's reading it,

the speaker reads an abstract of it, and puts the question whether or no it shall have a second reading? and after a second reading, the question is put, whether or no it shall be committed? which is either to a committee of the whole house, if it be of importance, or to a private committee, any member naming the persons. The committee being appointed, and a chairman chosen, the chairman reads the bill paragraph by paragraph, puts every clause to the question, fills up the blanks and makes amendments, according to the opinion of the majority. The bill thus gone through, the chairman makes his report at the side-bar of the house, reads all the additions and amendments, &c. and moves for leave to bring up the report to the table; which granted, he delivers it to the clerk, who reads the amendments, &c. The speaker then puts the question whether they shall be read a second time; and, if agreed to, he reads them himself. To so many of the amendments as the house acquiesces in, the question is now put, whether the bill, thus amended, shall be ingrossed and written fair upon parchment, and read a third time? and the bill being ingrossed, the speaker holds it in his hand, and asks if it shall pass? If the majority be for it, the clerk writes on it, *Soit baillé aux seigneurs*, let it be delivered to the lords: or, if in the house of lords, *Soit baillé aux communes*, let it be delivered to the commons. If a bill be rejected, it cannot be any more proposed during that session. A bill for a general pardon has but one reading.

When a member of the house of commons speaks, he stands up uncovered, and directs his speech to the speaker only. If what he says be answered by another, he is not allowed to reply the same day, unless personal reflections have been cast upon him: but when the commons, in order to have a greater freedom of debate, have resolved themselves into a committee of the whole house, every member may speak to a question as often as he thinks necessary. In the house of lords they vote, beginning at the puisne, or lowest baron, and so up orderly to the highest, every one answering *content* or *not content*. In the house of commons they vote by *yeas* and *nays*; and if it be dubious which are the greater number, the house divides. If the question be about bringing any thing into the house, the *yeas* go out; but if it be about any thing

thing the house already has, the *nays* go out. In all divisions the speaker appoints four tellers, two of each opinion. In a committee of the whole house, they divide by changing sides, the *yays* taking the right and the *nays* the left of the chair; and then there are but two tellers. If a bill pass one house, and the other demur to it, a conference is demanded in the painted chamber, where certain members are deputed from each house; and here the lords sit covered, and the commons stand bare and debate the case. If they disagree, the affair is null; but if they agree, this, with the other bills that have passed both houses, is brought down to the king in the house of lords, who comes thither clothed in his royal robes; before him the clerk of the parliament reads the title of each bill, and as he reads, the clerk of the crown pronounces the royal assent or dissent. If it be a public bill, the royal assent is given in these words, *Le roy le veut*, the king will have it so; if private, *Soit fait comme il est désiré*, let the request be complied with: if the king refuses the bill, the answer is, *Le roy s'avisera*, the king will think of it: and if it be a money-bill, the answer is, *Le roy remercie ses loyaux sujets, accepte leur benevolence, & aussi le veut*; the king thanks his loyal subjects, accepts their benevolence, and therefore grants his consent.

PARLIAMENTS of France, are sovereign courts, established by the king, finally to determine all disputes between particular persons, and to pronounce on appeals from sentences given by inferior judges. There are ten of these parliaments in France, of which that of Paris is the chief, its privileges and jurisdiction being of the greatest extent. It consists of six chambers, *viz.* the grand chamber, where causes of audience are pleaded; and five chambers of inquest, where processes are adjudged in writing. This parliament enjoys the privilege of verifying and registering the king's arrets or edicts, without which those edicts are of little or no value.

PARLIAMENT of Sweden, consists of four estates, with the king at their head: these states are, 1. the nobility and representatives of the gentry, with whom the colonels, lieutenant-colonels, majors, and captains of every regiment sit and vote. 2. The clergy, one of which body is elected from every rural deanery

of ten parishes; who, with the bishops and superintendents, amount to about two hundred. 3. The burghers, elected by the magistrates and council of every corporation as their representatives, of whom there are four for Stockholm, and two for every other town, amounting in the whole to about an hundred and fifty. 4. The peasants, chosen by the peasants out of every district; who choose one of their own rank, and not a gentleman, to represent them: these amount to about two hundred and fifty.

All these generally meet at Stockholm, and after the state-affairs have been represented to them from the throne, they separate, and sit in four several chambers or houses, in each of which affairs are carried on by a majority of votes; and every chamber has a negative in the passing any law.

PARLIAMENT is also sometimes used for other assemblies besides the states of a kingdom: thus the assembly of some of our inns of court, called to consult on their common affairs, is at this day called a parliament.

PARLOUR, a fair lower room, designed principally for the entertainment of company. See the article **APARTMENT**.

In nunneries, parlour, or parlair, is a little room or closet, where people talk to the nuns through a kind of grated window. Antiently there were parlours in the convents of monks, where the novices use to converse together at the hours of recreation; but there were listening places over, from whence the superiors could hear every thing that was said.

PARMA, the capital of the dutchy of Parma, in Italy, sixty miles north-east of Genoa, is pleasantly situated on a river to which it gives name: east long. 11°, north lat. 44° 45'.

PARMA, among antiquarians, denotes a kind of buckler, of a round figure, big enough to cover the whole body.

PARNASSIA, in botany, a genus of the pentandria-tetragynia class of plants, the corolla whereof consists of five roundish, emarginated, striated, concave, patent petals; the fruit is a tetragono-oval capsule, formed of four valves, containing one cell, and having a quadruple receptacle affixed to the valves: the seeds are numerous and oblong.

PARNASSUS, a mountain of Greece, much celebrated by antient poets, situated near Castro in Livadia.

PARNAU,

PARNAU, or **PERNOW**, a city and port-town of Livonia, eighty miles north of Riga.

PAROCHIAL, something belonging to a parish. See **PARISH**, **CHURCH**, &c.

PARODICAL *degrees of an equation*, in algebra, are the several regular terms in quadratic, cubic, biquadratic equations, &c. the indexes of whose powers ascend or descend orderly in an arithmetical progress, as $x^3 + x^2m + xr = s$, is a cubical equation, where no term is wanting, but having all its parodic degrees, the indexes of the terms regularly descending thus 3, 2, 1, 0.

PARODY, *παρωδια*, a popular maxim, adage, or proverb.

Parody is also a poetical pleasantry, consisting in applying the verses written on one subject, by way of ridicule to another; or in turning a serious work into a burlesque, by affecting to observe, as nearly as possible, the same rhymes, words, and cadences. It comes near to what some of our late writers call travesty; and was first set on foot by the Greeks, from whom we borrow the name.

PAROL, or **PAROLE**, in law, is used for a plea in court: sometimes this word is joined with the term lease; thus lease-parole denotes a lease by word of mouth, in order to distinguish it from a lease in writing.

PAROL-ARREST signifies an arrest by word of mouth, where authorised to be made; as in the case of a breach of the peace, committed in a justice of the peace's presence, he may thereon verbally order the offender to be arrested.

PAROL-DEMURRER is said to be a privilege allowed to an infant that is sued in relation to lands, which came to him by descent, when the court will give judgment, that the suit shall remain or continue, until the infant arrives at full age, viz. twenty-one years. In this case, if on a parol-demurrer, the age is granted, the writ does not abate, but the plea is put without day, till the infant is of age, and then it is revived by a resummons, &c. The plaintiff in an action cannot pray parol-demurrer, during the nonage of the infant-defendant, for it is grantable in favour of infants only.

PARONOMASIA, *παρωνομασια*, in rhetoric, a pun; or a figure whereby words nearly alike in sound, but of very different meanings, are affectedly or designedly used: thus Tully to Antony, *cum in*

gremio mimorum mentem & mentum deponeres.

PARONYCHIA, **WHITLOW**, in medicine, an inflammatory and exceeding painful disorder, which invests all the joints, and particularly the ends of the fingers; being generally much swelled with a beating or throbbing and intense heat. There is sometimes little or no tumour observed, when the disorder lies deep at, or in the bone; and sometimes again the tumour, pain, and inflammation are extended from the finger, up to the elbow, or even to the shoulder, from the communication of the fingers with those parts by the flexor-muscles. In some constitutions this disorder excites a raging fever with faintings, convulsions, deliriums, an abscess, or sphacelus of the parts; and without timely assistance death itself. Heister distinguishes three species of the paronychia; the first is when only the integuments are affected, at the end of the finger, either in its back or fore-part, or near the nail; in which case the symptoms are not usually very malignant, though the pain be extremely acute: the second kind is when the periosteum is inflamed or eroded, in which case the symptoms are more or less violent than the preceding, in proportion as that membrane is more or less violently affected: the third and worst species of this disorder is that investing the nervous involucre or coverings of the tendons, belonging to the flexor-muscles of the fingers, or even the adjacent nerves or tendons themselves; for in that case the disorder often appears with the most excruciating pains, and a train of the most malignant symptoms.

The true and proximate cause of a paronychia, in our author's opinion, ought to be referred to an inflammation of the adjacent integuments, chiefly of the periosteum, from an inspissation of the blood, or an obstruction of its small vessels: this inflammation may again proceed from an internal or external cause, acting separately or combined; such as an inspissation or acrimony of the blood and lymph, induced by a tense fibre, and a heating regimen, or an abuse of the non-naturals, joined with a contusion, wound, puncture, or with the stimulus of a foreign body.

For the cure of a paronychia, Garengot proposes incision before any trial has been made with other remedies; but Heister, agreeably to the advice of Hippocrates,

pebrates, is of opinion, that the disorder may be frequently dispersed and removed by the use of diluent, discutient, and cooling remedies, without an incision. The most approved method for removing an inflammation and obstruction in this manner, is to let the patient hold his finger, for several hours, in spirit of wine, highly rectified, and in which has been infused camphor or theriaca. See DISPERSION, DISCUTIENTS, &c.

But when there is already a suppuration actually formed, either before or under the use of these means, then an incision is the only remedy. In the first species of this disorder, the surgeon, as soon as he perceives the matter to point, or form a little protuberance, ought to hold and press it betwixt the finger and thumb of his left hand, while he makes a longitudinal incision therein, with his right, by which means the matter being discharged, the finger will then heal almost of itself. In the second species of the paronychia, an incision is to be made according to the preceding directions; only then more care is to be taken, that the knife penetrate to the bone: the incision being made, the blood should be suffered to flow out a little while, either of itself, or else it should be pressed out: then the wound is to be dressed with dry lint, and diachylon-plaster, with a compress dipped in warm spirit of wine, and retained on by a proper bandage: the wound is next to be treated like those in which the bones are affected; *viz.* with essence of myrrh, amber, balsam of Peru, &c.

In the third and last kind of this disorder, which our author confesses never occurred to his observation, the small tumour is first to be opened, by making an incision longitudinally, down into the capsule of the tendon, which will discharge a kind of lymph, or resum. If the internal sinus of the paronychia is in the middle part, or second joint of the finger, and is laid open so far by incision, in that case M. Petit advises to continue the incision even down for above a quarter of an inch into the hand: the dressings may be much the same as in the preceding case.

PAROS, one of the smallest islands of the Cyclades, famous for its marble, situated in east long. $25^{\circ} 30'$, north lat. $36^{\circ} 30'$.

PAROTIDES, in anatomy, two very remarkable glands, situated one on each side, between the ear and the angle of the lower jaw, and often extending them-

selves over a great part of the masseter. From each of these glands there runs a very large duct, about three fingers-breadth long, and of the thickness of a wheat-straw, having a great number of roots: this duct, from Steno, the discoverer, is by some called ductus salivalis steno-nius, by others ductus salivalis superior. It passes over the masseter-muscle, thro' the middle of the cheek, and there perforates the buccinator-muscle, and the membrane of the mouth, near the second or third of the dentes molares, and at this perforation it discharges a very large quantity of its proper fluid into the mouth. The parotides are among those glands that serve for the secretion of the saliva. See the articles GLAND and SALIVA.

PAROTIDES is also the name of certain tumours or inflammations arising behind the ears, on the parotid glands.

These tumours are very frequent after malignant and pestilential fevers. Children are also very particularly liable to them. They are of the same nature, and are to be treated in like manner with the buboes. See the article BUBO.

PAROXYSM, in medicine, the severe fit of a disease, under which it grows higher, or exasperates, as of the gout, &c.

It is also used for the access or return of a disease that intermits, as an ague, &c.

PARRELS, in a ship, are frames made of trucks, ribs, and ropes, which having both their ends fastened to the yards, are so contrived, as to go round about the masts; that the yards, by their means, may go up and down upon the masts: these also, with the breast-ropes, fasten the yards to the masts.

PARRICIDE, *parricida* or *patricida*, strictly signifies the murder or murderer of a father, as matricide does of a mother; yet this word is ordinarily taken in both senses, and is also extended to the murder of any near relation, as husband, wife, brother, sister, child, grand-child, uncle, &c. and even to that of great or sacred persons, though no way allied in blood, as a king, &c.

PARROQUET, in ornithology, a subdivision of parrots. See the next article.

PARROT, *psittacus*, a genus of birds, of the order of the accipitres, the characters of which are these; the beak is of a hooked or uncinated figure; and the toes are four on each foot, two forwards and two backwards.

There are three divisions of this genus:
1. The larger species, called macao, of which

which there are a great many very elegant species, particularly the erythrocyaneus. See ERYTHROCYANEUS.

2. The smaller kind, properly called parrots, make a very numerous and very beautiful tribe of birds.

3. The lesser kind, commonly called paroquettes, are likewise very numerous and very beautiful birds.

PARRYING, in fencing, the action of warding off the blows aimed at one by another. See the article FENCING.

PARSLEY, *petroselinum* or *apium*, in botany. See the article APIUM.

Parsley-seeds, whether in powder or decoction, is an excellent carminative, as is also its distilled oil.

Parsley-root is one of the five greater opening roots: it is attenuant, aperient, detergent, and diuretic; and is prescribed in diet-drinks, in chronic cases arising from obstructions of the viscera: and in any form, it is a powerful diuretic.

PARSNIP, *pastinaca*, in botany, a genus of the pentandria-digynia class of plants, the universal flower of which is uniform, and the particular ones composed of five lanceolated petals, bending inwards; the fruit is composed of two large, flattish, marginated seeds.

The seeds of the wild parsnip are carminative, and therefore good in flatulences and colics: they are also said to be diuretic, aperient, and to promote the menses.

PARSON, the rector or incumbent of a parish-church. See the articles CHURCH and CLERGY.

It is said, there may be two several parsons in the same church, one of the one moiety, and one of the other, wherein a part of the church and town is allotted to each of them; and there may also be two clergymen, who make but one parson in a church, where they are presented by the same patron. Where a person is a complete parson, made so by presentation, institution, and induction, he may cease to be a parson of the church divers ways, as by cession, where he resigns or is deprived, either for simony, nonconformity to the canons, adultery, &c. Parsons ought generally to abide on their rectories, and live in the parsonage-house, unless it be in cases of sickness, &c. they are prohibited to take farms or leases of land, on pain of 10 l. per month, forfeiture; and may not buy to sell again any merchandize, &c. which makes them liable to forfeit triple value.

PARSON IMPARSONE/E, signifies one that

is in possession of a church, whether it be presentative or impropriate, and with whom the church is then full.

Persona impersonata is a plea in the writ quare impedit, that the parson is admitted and instituted in the church, &c.

PARSONAGE, a rectory or parish-church, endowed with a house, glebe, lands, tithes, &c. for the maintenance of a minister, with cure of souls within such parish. There may, notwithstanding, be a parsonage without either glebe or tithes, but only annual payments instead thereof. As to the rights to the parsonage and church, they are of several natures; the right of the parson concerns the possession of it; that of the patron, his presentation; and the ordinary, his investiture, &c. but no charge can be laid thereon, without the consent and agreement of all of them. If the parson wastes the inheritance of the church, by cutting down trees, &c. his patron may have a prohibition.

PART, *pars*, a portion of some whole, considered as divided or divisible.

Part, according to Chauvinus, is usually distinguished into logical and physical. Logical part is that referring to some universal as its whole; in which sense, the species are parts of a genus; and individuals, or singulars, are parts of the species. Physical part, is that which, tho' it enters the composition of a whole, may yet be considered apart, and under its own distinct idea; in which sense, a continuum is said to consist of parts. It is controverted in the schools, whether the parts of a continuum, or physical whole, *e. gr.* water, do exist actually before the division be made, or only potentially. Physical parts, again, are of two kinds, homogeneous and heterogeneous: the first are those of the same denomination with the other; the second, of a different one. See HOMOGENEOUS, &c.

Parts, again, are distinguished into subjective, essential, and integrant. Subjective or potential part is the same with logical part, *viz.* that contained in some universal whole, not in act, but only in power; as man and horse are in animal, Peter and Paul in man. Essential part is that whereby, with the concurrence of some other, an essential whole is constituted; thus, the body and soul are essential parts of man. Integrant or integral part, is that which is necessary to the integrity of the whole, as a head is of a man, &c.

Consent of PARTS, in medicine. See the article CONSENT.

PART, in geometry and astronomy, is applied to the division of lines and circles, &c.

Aliquot PART, and *Aliquant* PART, in arithmetic. See the article ALIQUOT and ALIQUANT.

Proportional PART, is a part or number agreeable and analogous to some other part or number; or a medium to find some number or part unknown, by proportion and equality of reason.

Similar PARTS, are those which are to one another, as their wholes are to one another.

Organical PART. See ORGANICAL.

PART, in music, denotes a piece of the score, or partition, written by itself, for the conveniency of the musician; or it is one or more of the successions of sounds, which make the harmony, written apart. Or, the parts are the sounds made by several persons, singing or playing in concert.

Music in parts was unknown to the ancients; they had but one part: all their harmony consisted in the succession of notes, none in the consonance.

There are four principal parts, the treble, bass, tenor, and counter-tenor. Some compare the four parts in music to the four elements; the bass, they say, represents the earth; the tenor, the water; counter-tenor, air; and treble, fire.

PARTS of speech, in grammar, are all the sorts of words which enter the composition of discourse. See SPEECH.

The grammarians generally admit of eight parts of speech, viz. noun, pronoun, verb, participle, adverb, preposition, interjection, and conjunction. See the articles NOUN, PRONOUN, &c.

PART of fortune, in the judicial astrology, is the lunar horoscope, or the point wherein the moon is, at the time when the sun is in the ascending part of the east. The sun in the ascendant, is supposed, according to this science, to give life, and the moon dispenses the radical moisture, and is one of the causes of fortune. In horoscopes, the part of fortune is represented by a circle divided by a cross. See the article HOROSCOPE.

PART, or DEPART, in the manege, a word used to signify the motion and action of a horse, when put on at full speed. From the horse's parting to his stop, there are commonly two hundred paces of ground. To make your horse part with a good

grace, you must put your bridle three fingers lower, and press gently with your heels, or with the calves of your legs.

PARTENKIRK, a town of Germany, in the circle of Bavaria, situated forty miles south-west of Munich.

PARTENAY, a town of France, in the province of Orleans, and territory of Poitou, situated thirty miles west of Poitiers.

PARTERRE, in gardening, a level division of ground, which, for the most part, faces the south, and best front of an house; and is generally furnished with greens, flowers, &c.

There are several sorts of parterres, as plain grass with borders, and parterres of embroidery, &c. Plain parterres are more beautiful in England than in any other country, by reason of the excellency of our turf, and that decency and unaffected simplicity that it affords to the eye of the spectator. Other parterres are cut into shell and scroll-work, with sand-alleys between them; which sort of parterres are esteemed finest in France. As to the general proportions of parterres, an oblong or long square is esteemed the best; therefore a parterre should not be less than twice as long as it is broad; twice and a half is accounted a very good proportion; and it is very rare that three times is exceeded. As to the breadth of a parterre, it is to take its dimensions from the breadth of the front of the house; if the front of the house is one hundred feet long, the breadth of the parterre should be one hundred and fifty feet; and if the front of the house be two hundred feet, the parterre should be fifty feet broader: but where the front exceeds the breadth of this parterre, it will be a good proportion to make the parterre of the same dimensions with the front. There should be a terrace-walk on each side of the parterre, for an elevation proper for view; and, therefore, there should never be the flat of a parterre between terrace-walk and terrace-walk above three hundred feet; nor can it be well made less than one hundred and forty. As to the adorning and furnishing these parterres, whether it be plain or with embroidery, that depends much upon the form of them, and therefore must be left to the judgment and fancy of the designer.

PARTHENIUM, AMERICAN FEVER-FEW, in botany, a genus of the monoecia-gen.

pentandria class of plants, the compound flower of which is convex; there are several corollulæ in the disc, which are monopetalous, tubulose, ligulated, erect, quinquifid at the mouth, and of the length of the cup; the female flowers are also monopetalous, but they are tubulated, ligulated, oblique, obtuse, roundish, and of the length of the hermaphrodite ones; they are five in number, and are placed in the verge or radius: there is no other fruit but the cup, which remains upon the plant unaltered: the seed in the hermaphrodite flowers is abortive; and in the female, it remains in the cup, and is single, of a turbinato-cordated form, compressed, and naked.

The leaves and flowers of this plant are recommended in frigid and flatulent affections of the uterus, in obstructions of the menses, in venereal weaknesses, and in the dropsy. They are also of great use in putrid fevers, the stone in the kidney, vertigo, and arthritis.

PARTHIA, a country of Asia, formerly so called, situated almost in the middle of the modern Persia.

PARTI, PARTIE, PARTY, or PARTED, in heraldry, is applied to a shield or escutcheon, denoting it divided or marked out into partitions. See **SHIELD**, &c.

The french heralds, from whom we borrow the word, have but one kind of parti, the same with our parti per pale, which they simply call parti: but with us the word is applied to all sorts of partitioning, and is never used without some addition, to specify the particular kind intended; thus we have parti or parted per cross, per chief, per pale, per fess, per bend dexter, per bend sinister, per chevron, &c. See **QUARTERING**.

The humour of our ancestors, Columbier observes, turning much upon exploits of arms and chivalry, they used to preserve their battered and hacked armour as honourable symbols of their hardy deeds; and those who had been in the hottest service, were distinguished by the most cuts and bruises that appeared on their shields. To perpetuate the memory hereof, says the same author, they caused them to be painted on their shields, and thus handed down to posterity. And when heraldry grew into an art, and officers were appointed to direct the manner of bearing and blazoning, they gave names to those cuts, answerable to the nature thereof, appointing four, from which all the others proceed; these are

parti, called by our heralds parti per pale; couped, parti per fess; tranche, parti per bend dexter; and taille, parti per bend sinister. See **COUPED**, &c.

Parti per pale is when the shield is divided perpendicularly into two halves, by a cut in the middle from top to bottom. See plate CXCIII. fig. 3.

• Parti per fess is when the cut is across the middle, from side to side.

Parti per bend dexter, is when the cut comes from the upper corner of the shield, on the right hand, and descends athwart to the opposite lower corner.

Parti per bend sinister, is when the cut, coming from the upper left corner, descends across to the opposite lower one.

From these four partitions have proceeded an infinite number of others, of various and extravagant forms.

PARTICIPATION, that which gives a part or share in any thing, either by right or grace.

PARTICIPLE, *participium*, in grammar, an adjective formed of a verb, so called because it participates partly of the properties of a noun, and partly of those of a verb; being variable through genders and cases, like the former; and regarding time, action, passion, &c. in manner of the latter. See the articles **NOUN** and **VERB**.

Thus the participle retains the attribute of the verb; and, moreover, the designation of the time or tense; there being participles of the present, the præterite, and future, especially in Greek: but this is not always observed, the same participle being frequently joined with all sorts of tenses. There are active and passive participles; the active, in latin, end in *ans* or *ens*, as *amans*, *docens*; the passive in *us*, as *amatus*, *doctus*; tho' there are some of these that are active, namely those of verbs deponents, as *locutus*. But there are others likewise which add to this passive signification a sort of compulsive, or obligatory sense; these are the participles in *dus*, as *amandus*, which ought to be loved; though sometimes the latter signification is entirely lost.

The property of the participles of verbs active, is to signify the action of the verb, as it is in the verb, that is, in the course of the action itself; whereas the verbal nouns, which signify actions also, signify them rather in the habit than in the act: for which reason the participles have the same government as the verb, as *amans deum*; whereas verbal nouns have only the

same government as nouns, as *amator dei*: and the participle itself has the same government as nouns when it signifies rather the habit than the act of the verb, by reason it then has only the nature of a simple noun verbal, as *amans virtutis*.

In our language, the participles and gerunds are not at all distinguishable.

PARTICLE, in physiology, the minute part of a body, an assemblage of which constitute all natural bodies. See the articles **ATOM** and **MATTER**.

It is the various arrangement and texture of these particles, with the difference of cohesion, &c. that constitute the various kinds of bodies. The smallest particles cohere with the strongest attraction, and compose bigger particles of weaker cohesion, and many of these cohering compose bigger particles, whose vigour is still weaker; and hereupon the operations in chemistry, and the colours of natural bodies depend, and which, by cohering, compose bodies of sensible bulk. The cohesion of the particles of matter, the epicureans imagined, was effected by means of hooked atoms; the aristotelians, by rest; but Sir Isaac Newton shews, that it is done by means of a certain power, whereby the particles mutually attract and tend towards each other. By this attraction of the particles, he shews, that most of the phaenomena of the lesser bodies are affected, as those of the heavenly bodies are, by the attraction of gravity. See **ATTRACTION** and **GRAVITATION**.

PARTICLE, in grammar, a denomination for all those small words that tie or unite others together, or that express the modes or manners of words, usually included by grammarians under these four parts of speech, *viz.* adverbs, prepositions, interjections, and conjunctions. See the articles **PARTS of speech**, **ADVERB**, &c. Mr. Locke observes, that it is in the right use of particles, the clearness and beauty of a good style more particularly consists. To express the dependence of his thoughts and reasonings, one upon another, a man must have words to shew what connection, restriction, distinction, opposition, emphasis, &c. he gives to each respective part of his discourse. This cannot be rightly understood without a clear view of the postures, stands, turns, limitations, exceptions, and several other thoughts of the mind. Of these there is a great variety, much exceeding the number of particles that most languages have

to express them by; for which reason it happens, that most of these particles have divers, and sometimes almost opposite significations.

PARTICULAR, *particularis*, a relative term referring to species or individual, and opposed to general or universal. See the articles **SPECIES** and **GENERAL**.

There is this difference between particular and singular, that particular denotes a thing taken as a part, as Peter in respect of mankind; whereas singular denotes the part taken after the manner of a whole, as Peter considered in himself. See the article **SINGULAR**.

PARTIES, in law, signify the persons that are named in a deed or fine, *viz.* those that made the deed, or levied the fine, and also those to whom the same was made or levied.

Here it is to be observed, that if an indenture was made between two parties, mentioned particularly in the beginning of the deed, and therein one of them grants to another that is not named at the beginning thereof, such person is no party to that deed, nor can take any thing thereby. The parties to a suit at law are the plaintiff and defendant, who carry on the suit.

PARTING, or **DEPARTING**, a method of separating gold and silver, by means of aqua fortis; for the operation of which see **ASSAYING** and **QUARTATION**.

PARTITION, in law, signifies a division of lands, &c. descended by common law or custom among coheirs or parceners, being two at least. Partition may also be made by joint tenants, and tenants in common by assent, deed, or writ. See the article **CO-PARCENERS**.

PARTITION, in rhetoric, the same with division. See the article **DIVISION**.

PARTITION, in music, the disposition of the several parts of a song set on the same leaf, so as upon the uppermost ranges of lines are found the treble; in another, the bass; in another, the tenor, &c. that they may be all sung or played, either jointly or separately. See the articles **PART**, **MUSIC**, &c.

PARTITION, in architecture, that which divides or separates one room from another. See the article **BUILDING**.

PARTITION, in heraldry. See the article **QUARTERING**.

PARTITIONE FACIENDA, in law, a writ which lies for those who hold lands or tenements pro indiviso, and would sever

sever to every one his part, against them that refuse to join in partition, as co-partners.

PARTNER and **PARTNERSHIP**. See the article **FELLOWSHIP**, &c.

If there be several joint partners, and a person has dealings generally with one of them in matters concerning their joint trade, whereby a debt becomes due to the said person, it shall charge them jointly and the survivors of them; but if the person only dealt with one of the partners upon a separate account, in that case the debt shall only affect that partner and his executors. If one or more of the joint traders become bankrupt, his or their proportions are only assignable by the commissioners, to be held in common with the rest who are not bankrupts. If one of two partners becomes a bankrupt, the commissioners cannot meddle with the interest of the other, for it is not affected with the bankruptcy of his companion. Payment to one of the partners, is payment to them all.

PARTNERS, in a ship, are strong pieces of timber bolted to the beams incircling the masts, to keep them steady in their steps, and also keep them from rolling, that is, falling over the ship's sides. There are also of these partners at the second deck, to the same end; only the mizen-mast hath but one pair of partners, in which that mast is wedged so firm that it cannot move. Some ships do not sail well, unless their masts are loose, and have leave to play in the partners; but in a storm this is dangerous, lest the partners should be wronged, (as they say) *i. e.* forced out of their places; for then there is no help but to cut the mast by the board.

PARTRIDGE, in ornithology, is a species of tetrao, with a naked scarlet mark behind the eyes. See **TETRAO**.

The common partridge is too well known, to need a farther description: it is common in fields, and called by authors perdix. But besides the common kind, there is another somewhat larger species, called the red-legged partridge, with a grey tail, variegated in the upper part with brown.

Partridges are caught by means of nets, bird-lime, setting-dogs, &c. as also by driving. See **NET**, **BIRD-LIME**, &c.

PARTURITION, the same with delivery. See the article **DELIVERY**.

PARTY, in politics, denotes a faction considered as opposing another: such are

the whigs and tories. See the articles **WHIG** and **TORIES**.

In law, party-jury is one impanelled in actions brought for or against foreigners. See the article **MEDIETAS LINGUÆ**.

In a military sense, party denotes a small body of men, whether foot or horse, or both, sent on some expedition.

PARTY, or **PARTI**, in heraldry. See the article **PARTI**.

PARU, in ichthyology, a species of chætodon. See the article **CHÆTODON**.

PARULIDES, in surgery, tumours and inflammations of the gums, commonly called gum-boils.

They are to be treated with discutients, like other inflammatory tumours. Sage, camomile and elder-flowers, boiled in milk or water, make a gargarism to be held in the mouth warm; and the remaining herbs may be sowed up in a bag, and applied hot to the cheeks. See the article **DISPERSION**.

But if the disorder cannot be thus dispersed, emollient applications of mallows, &c. are good; and to forward the maturation externally, a half-roasted fig may be applied: and when the softness of the tumour shews that the matter is suppurated, it ought immediately to be opened by the lancet, to prevent the matter's lodging there, and eroding the bone, and producing a fistula or caries. After it is opened, the matter should be gently pressed out with the fingers, and the mouth frequently washed with red wine mixed with a decoction of vulnerary herbs till it is well. When the ulcer has penetrated deep, it will be necessary to inject the same liquors with a syringe, and compress the part by a proper external bandage, to make the bottom part heal first; and when it is already become fistulous, and has callous edges, it may then often be cured by injecting tincture of myrrh, and elixir proprietatis, continuing this for some time. If all these prove ineffectual, the fistula must be laid open by incision, and the caries removed by medicines, caustics, or the actual cautery. If this proceeds, as sometimes it does, from a carious tooth, this is first of all to be extracted, otherwise the tumour will degenerate into a fistula: and it is always best to be early in making the incision.

PARUS, the **TITMOUSE**, in ornithology. See the article **TITMOUSE**.

PARYPATE, in the antient music. See the article **DIAGRAM**.

PAS,

PAS, a town of the french Netherlands, twelve miles south-west of Arras.

PASCHAL, something belonging to the passover or easter. See the articles **PASS-OVER** and **EASTER**.

PASCHAL LETTER. See **LETTER**.

PASLEY, a town of Scotland, in the county of Renfrew, six miles west of Glasgow.

PASQUIN, a mutilated statue at Rome, in a corner of the palace of the Ursini: it takes its name from a cobbler of that city called Pasquin, famous for his sneers and gibes, and who diverted himself with passing his jokes on all the people who went through that street. After his death, as they were digging up the pavement before his shop, they found in the earth the statue of an antient gladiator, well cut, but maimed, and half spoiled: this they set up in the place where it was found; and by common consent named it Pasquin. Since that time all satires are attributed to that figure, and are either put into its mouth or pasted upon it, as if they were wrote by Pasquin redivivus; and these are addressed by Pasquin to Marforio, another statue at Rome. When Marforio is attacked, Pasquin comes to his assistance; and when Pasquin is attacked, Marforio assists him in his turn.

PASQUINADE, a satirical libel fastened to the statue of Pasquin: these are commonly short, merry, and pointed; and from hence the term has been applied to all other lampoons of the same cast. The difference between a pasquinade and a satire is, that the end of the latter is to correct and reform, while that of the former is only to ridicule and expose.

PASS, a strait, difficult, and narrow passage, which shuts up the entrance into a country.

The first care of the general of an army is to seize the passes of the country into which he would carry the war, to fortify them, and take care that they are well guarded.

PASS of arms, in chivalry, a bridge, road, &c. which the antient knights undertook to defend.

The knights who held a pass, hung up their arms on trees, pales, columns, &c. erected for that purpose; and such as were disposed to dispute the pass, touched one of the pieces of armour with his sword, which was a challenge the other was obliged to accept; when the van-

quished gave the victor such a prize as was before agreed on.

PASS, or **PASSADE**, in fencing, an advance or leap forward upon the enemy. Of these there are several kinds, as passes within, above, beneath, to the right, the left, and passes under the line, &c. The measure of the pass is, when the two smalls of the swords are so near, as that they may touch one another.

PASSADE, in the manege, is a turn or course of a horse backwards or forwards, on the same spot of ground. Hence there are several sorts of passades, according to the different ways of turning, in order to part, or return upon the same tread, which is called closing the passade; as the passade of one time, the passade of five times, and the raised or high passades, in which the demi-volts are made into curvets. See the articles **CURVET** and **VOLT**.

In all passades the horse, in making the demi-volt, should gather and bring in his body, making his haunches accompany his shoulders, without falling back, or not going forward enough each time; and he should go in a strait line, without traversing or turning his croup out of the line.

PASSAGE, in the manege, is a horse's walking or trotting in such a manner that he raises the outward hind-leg, and the inward fore-leg together; and setting these two on the ground, raises the other two alternately, never gaining above a foot of ground at a time. A horse is passaged upon two strait lines along a wall or hedge, and also in going sideways in a circle round a center. The beauty of the passage consists in holding the legs long in the air.

PASSAGE, or **PASSO**, in music, a part of an air or tune, consisting of several short notes, as quavers, semi-quavers, &c. lasting one, two, or at most three measures, in the beginning of a piece, which is to be afterwards imitated in the other notes of the piece, not with the same chords or notes, but only by observing the same motion, number and figure, as in the notes of the first passage. This is called by the Italians *contrapunto d'un sol passo*.

Birds of PASSAGE, a name given to those birds which at certain stated seasons of the year remove from certain countries, and at other stated times return to them again, as our quails, woodcocks, storks, nightin-

nightingales, swallows, and many other species. The generality of birds that remain with us all winter have strong bills, and are enabled to feed on what they can find at that season; those which leave us, have usually very slender bills, and their food is the insects of the fly-kind; which disappearing towards the approach of winter, compel them to seek them in the warmer regions where they are to be found. Among the birds of passage, the fieldfare, the redwing, the woodcock, and the snipe, come to us in the autumn, at the time when the summer birds are leaving us, and go from us again in spring, at the time when these return; and of these the two last often continue with us through the summer, and breed; so that the two first seem the only kinds that certainly leave us at the approach of spring, retiring to the northern parts of the continent, where they live during the summer, and breed; and at the return of winter, are driven southerly from those frigid climes, in search of food, which there the ice and snow must deprive them of.

Right of PASSAGE, in commerce, is an imposition or duty exacted by some princes, either by land or sea, in certain close and narrow places in their territories, on all vessels and carriages, and even sometimes on persons or passengers coming in or going out of ports, &c. The most celebrated passage of this kind in Europe is the Sound, the dues for passing which strait belong to the king of Denmark, and are paid at Elsenore or Cronenburg.

PASSAGE, in geography, a port-town of Spain, in the province of Biscay, sixty miles east of Bilboa.

PASSANT, in heraldry, a term applied to a lion, or other animal, in a shield, appearing to walk leisurely: for most beasts, except lions, the term trippant is frequently used instead of passant.

PASSAO, or *CAPE PASSAO*, a promontory of Peru, just under the equator: west long. 81°.

PASSAU, the capital of the bishopric of the same name, in the circle of Bavaria, situated on the confluence of the rivers Danube, Inn, and Ilts: east long. 13° 30' north lat. 48° 30'.

PASSER, the SPARROW. See SPARROW.

PASSERES is also the name of a class of birds, with a conic and much attenuated beak. See ORNITHOLOGY.

PASSER FLUVIATILIS, a name used by some for the common flounder.

PASSERINA, in botany, a genus of the octandria-monogynia class of plants, the flower of which is composed of a single petal, divided into four oval segments at the limb: the fruit is a coreaceous capsule, of an oval shape, with only one cell, and containing a single oval seed, pointed at each end.

PASSIFLORA, *PASSION-FLOWER*, in botany, a genus of the gynandria-pentagynia class of plants, the corolla of which consists of five petals, of the largeness and figure of those of the cup: the fruit is a berry, supported on a pedicle. This is an extremely beautiful flower, a species of which, called murucuja, or the lunated-leaved, scarlet, passion-flower, is represented in plate CXCIV. fig. 8.

PASSIONS, in moral philosophy, are certain motions of the soul, which make it pursue what appears to be good, and avoid whatever threatens evil. See the articles GOOD and EVIL.

By reflecting, says Mr. Locke, on the various modifications or tempers of the mind, and the internal sensations which pleasure and pain, good and evil produce in us, we may thence form to ourselves the ideas of our passions. Thus, by reflecting upon the thought we have of the delight which any thing is apt to produce in us, we form an idea which we call love. Desire is that uneasiness which a man finds in himself upon the absence of any thing, the present enjoyment of which causes delight. Joy is a delight of the mind, arising from the present, or assured approaching, possession of some good. Sorrow is an uneasiness of the mind, upon the thought of a good lost, or the sense of a present evil. Hope is a pleasure in the mind, upon the thought of a probable future enjoyment of a thing which is apt to delight. Fear is an uneasiness of the mind, upon the thought of a future evil likely to befall us. Anger is a discomposure of the mind, upon the receipt of injury, with a present purpose of revenge. Despair is the thought of the unattainableness of any good. Envy is an uneasiness of mind, caused by the consideration of a good we desire, obtained by one we think should not have had it before us.

On the just regulation and subordination of the passions, depends, in a great measure, the happiness of mankind. See the articles ETHICS and HAPPINESS.

It ought to be observed here, in reference to the passions, that the removal or lessening

sening of a pain is considered, and operates as pleasure; and the diminishing of a pleasure as pain; and, farther, that the passions in most persons operate on the body, and cause various changes in it; whence the consideration of them in medicine and painting.

PASSIONS, in medicine, make one of the non-naturals, and produce very sensible effects. Joy, anger, and fear are the principal. In the two first, the spirits are hurried with too great vivacity; whereas, in fear or dread, they are as it were curbed and concentrated: whence we may conclude, that they have a very bad effect upon health; and therefore it will be best to keep them within bounds as much as possible, and to preserve an inward serenity, calmness, and tranquillity. Continual sorrow and anguish of mind render the fluids thick, and generate viscid and acid crudities in the stomach, and at length render the body unapt for a due circulation; whence proceed obstructions of the viscera, and many chronical disorders. Anger constricts the bilious vessels in particular, and causes too great an evacuation of the bile; produces strictures in the stomach and duodenum; whence the bilious humours are amassed and corrupted; laying a foundation for vomiting, bilious fevers, and cardialgiae.

The passions of the mind, in general, chiefly affect the stomach, invert its motion, hinder digestion and chylification; whence many crudities arise, fruitful of various diseases: hence it is very dangerous, after violent commotions of the mind, to sit down to a meal; or, during that time, to be greatly affected with any accident that may happen.

For the treatment of the iliac, hypochondriac, coeliac, hysteric, &c. passion, see the articles ILIAC, &c.

PASSIONS, in painting, are the external expressions of the different dispositions and affections of the mind; but particularly their different effects upon the several features of the face: for though the arms, and indeed every part of the body, serve likewise, by their quick, languid, and variously diversified motions, to express the passions of the soul; yet, in painting, this difference is most conspicuous in the face.

In sorrow, joy, love, shame, and compassion, the eyes swell all of a sudden, are covered with a superabundant moisture, and drop tears; and in grief es-

pecially, the corners of the mouth hang down, the eye-lids are half shut, and the pupil of the eye is elevated and half covered; and all the other muscles of the face are relaxed, so that the visage appears longer than ordinary.

In fear, terror, fright, and horror, the eye-brows are greatly elevated, the eye-lids are expanded as wide as possible, so as to discover the white of the eye, and the pupil is depressed and half covered by the lower eye-lid; the hair stands an end; the mouth is at the same time wide open, and the lips so far drawn back, that the teeth both of the upper and under jaw appear.

Contempt is expressed by raising one side of the upper-lip, so as to discover the teeth, whilst the other side has a movement like that in laughter; the eye, on that side where the teeth appear, is half shut, whilst the other remains open; however, both the pupils are depressed.

In jealousy, envy, hatred, and malice, the eye-brows are knit; and, in laughter, all the parts agree, tending as it were towards the center of the face.

Mr. le Brun has been extremely happy in expressing the several passions, and the examples he has left of them deserve imitation.

PASSIONS, in poetry, are of singular use in distinguishing the characters of the actors. See the article CHARACTER.

But though the passions be always necessary, yet all are not equally suitable to every kind of poetry: thus comedy has joy and agreeable surprise for its part; tragedy, on the contrary, has terror and compassion; and epic, as a medium between the two, takes in both these kinds of passions, though its proper passion is admiration. See the articles COMEDY, TRAGEDY, and EPIC.

PASSION, or *cross of the PASSION*, in heraldry, is so called, because resembling the shape of that on which our Saviour is thought to have suffered; that is, not crossed in the middle, but a little below the top, with arms short in proportion to the length of the shaft. See plate CXCIV. fig. 5.

PASSION FLOWER, *passiflora*, in botany. See the article PASSIFLORA.

PASSION-WEEK, the week immediately preceding the festival of Easter: so called, because in that week our Saviour's passion and death happened. See EASTER.

The Thursday of this week is called Maunday-Thursday; the Friday, Good-Friday;

Friday; and the Saturday, the great Sabbath.

PASSIVE, in general, denotes something that suffers the action of another, called an agent, or active power. See the articles **AGENT** and **ACTIVE**.

In grammar, the verb or word that expresses this passion, is termed a passive verb; which, in the learned languages, has a peculiar termination, as *amor*, *doceor*, &c. in Latin; that is, an *r* is added to the actives *amo*, *doceo*: and, in the Greek, the inflection is made by changing *ω* into *μαι*, as *τύπλω*, *τύπλομαι*, &c. But, in the modern languages, the passive inflection is performed by means of auxiliary verbs, joined to the participle passive; as *I am praised*, in latin *laudor*, and in greek *επαινέομαι*; or *I am loved*, in latin *amor*, and in greek *φιλέομαι*. Thus it appears, that the auxiliary verb *I am*, serves to form the passives of english verbs; and the same holds of the french, as *je suis loué*, I am praised; *j'aye été loué*, I have been praised, &c.

PASSOVER, a solemn festival of the Jews, celebrated on the fourteenth day of the month next after the vernal equinox, and instituted in commemoration of their coming out of Egypt; because on the night before their departure the destroying angel, who put to death the first-born of the Egyptians, passed over the houses of the Hebrews, which were sprinkled with the blood of a lamb. The whole transaction is related in the twelfth chapter of Exodus.

They were ordered before this festival to kill the paschal lamb; and to sprinkle their door-posts with its blood; and the following night, which was the grand feast of the passover, and which was to continue seven days; they were to eat the lamb roasted with a sallad of wild-lettuces, or other bitter herbs, in the posture of travellers; and if any part remained the day following, it was to be thrown into the fire; and for eight days together no leavened bread was to be used, on pain of being cut off from the people. The rabbins inform us of some other observances of the Jews in relation to the passover. They were so scrupulous in abstaining from leavened bread during this festival, that they usually examined every hole and corner of the house, that not the least crumb of it might be concealed. On the vigil of the feast the matron of the family spread a table, and set on it two unleavened cakes; two pièces

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of the lamb, one boiled and the other roasted, to put them in mind that God had delivered them with an out-stretched arm: to this they added some small fishes, because of the leviathan; a hard egg, because of the bird ziz; some meal, because of the behemoth: these three animals being, according to their rabbinical doctors, appointed for the feast of the elect in the other life. The father of the family sat down with his children and slaves, took bitter herbs, eat them with mustard, and distributed them. Then they eat of the lamb, the institution of which was at that time recited by the master of the family, and the whole repast was attended with hymns and prayers. The modern Jews in general observe the same ceremonies.

PASS PAROLE, a command given at the head of an army, and thence communicated to the rear by passing it from mouth to mouth.

PASS-PAR-TOÛT, a master-key; or a key that opens several locks belonging to the same house or apartment.

PASS-PORT, or **PASS**, a licence or writing obtained from a prince or governor, granting liberty and safe conduct to pass through his territories without molestation.

Pass-port also signifies a licence obtained for importing contraband goods, or for exporting and importing merchandize without paying the duties; these last licences are always given to ambassadors and other public ministers, for their baggage, equipage, &c.

If any person forge or counterfeit a pass-port, commonly called a Mediterranean pass, for any ship, or shall alter or erase any pass made out by the commissioners for executing the office of lord high admiral, or shall publish as true any forged, altered, or erased pass, knowing the same to be forged, &c. every such person being convicted in any part of his majesty's dominions where such offence may be committed, shall be guilty of felony without benefit of clergy, by 4 Geo. II. cap. 18, sect. 1.

PASS-VOLANT, or **PASSE-VOLANT**, in a military sense, the same with a faggot. See the article **FAGGOT**.

In France all pass-volants are marked on the cheek with a fleur de-lis.

PASTBOARD, a kind of thick paper formed of several sheets of paper pasted together.

The chief use of pastboard is in binding books,

books, making letter-cases, &c. Pasteboards, on importation, pay the thousand, 2s. 6⁸⁰/₁₀₀ d. and on exportation draw back 2s. 3 d. and besides for every hundred weight 7 s. 6 d. which is drawn back on exportation.

PASTE, a composition of water and flour, boiled to a consistence; used by various artificers, as sadlers, upholsterers, bookbinders, &c.

In cookery, paste is the composition of flour, &c. wherein pies are baked: and in confectionary, paste denotes a preparation of some fruit, made by beating the pulp thereof with some fluid, or other admixture; and afterwards drying it with sugar, till aspliable as common paste.

PASTE, in the glass-trade, a kind of coloured glass, made of calcined crystal, lead, and metallic preparations, so as to imitate the natural gems; for the manner of effecting which, see **GEM**.

PASTEL, a name by which some call isatis, or woad. See the article **ISATIS**.

PASTERN of a horse, in the manege, is the distance between the joint next the foot, and the coronet of the hoof. This part should be short, especially in middle-sized horses, because long pasterns are weak, and cannot so well endure travelling.

PASTERN-JOINT, the joint next a horse's foot.

When the pastern-joint swells after travelling, chafe it every morning and evening with a mixture of two parts of brandy, and one of oil of nuts.

PASTIL, or **PASTEL**, among painters, a kind of paste made of different colours; ground up with gum-water, in order to make crayons. See **CRAYON**.

Sometimes the crayons themselves are called pastils.

PASTIL, in pharmacy, is a dry composition of sweet-smelling resins, aromatic woods, &c. sometimes burnt to clear and scent the air of a chamber.

There are also pastils for the mouth, which being chewed, procure a sweet breath.

PASTINACA, the **PARSNEP**, in botany. See the article **PARSNEP**.

PASTINACA MARINA, the **FIRE FLAIRE**, in ichthyology, the name by which authors call the smooth ray-fish, with a long spine in the tail, serrated before. See the article **RAY-FISH**.

PASTO, a city of Popayan, in south America: west long. 77°, north lat. 2°.

PASTOR, properly signifies a shepherd,

but is now generally used for a parson or minister that hath cure of souls. See the articles **PARSON** and **CURE**.

PASTORAL, in general, something that relates to shepherds; hence we say, pastoral life; manners, poetry, &c.

The original of poetry is ascribed to that age which succeeded the creation of the world: and as the keeping of flocks seems to have been the first employment of mankind, the most antient sort of poetry was, probably, pastoral. It is natural to imagine, that the leisure of those antient shepherds admitting and inviting some diversion, none was so proper to that solitary and sedentary life as singing; and that in their songs they took occasion to celebrate their own felicity. From hence a poem was invented, and afterwards improved to a perfect image of that happy time; which, by giving us an esteem for the virtues of a former age, might recommend them to the present. And since the life of shepherds was attended with more tranquility than any other rural employment, the poets chose to introduce their persons from whom it received the name of pastoral.

A pastoral is an imitation of the action of a shepherd, or one considered under that character. The form of this imitation is dramatic, or narrative, or mixed with both; the fable simple; the manners not too polite nor too rustic; the thoughts are plain, yet admit a little quickness and passion, but that short and flowing; the expression humble, yet as pure as the language will afford; neat, but not florid; easy, and yet lively. In short, the fable, manners, thoughts, and expressions are full of the greatest simplicity in nature.

The complete character of this poem consists in simplicity, brevity, and delicacy; the two first of which render an eclogue natural, and the last delightful.

If we would copy nature, it may be useful to take this idea along with us, that pastoral is an image of what they call the golden age. So that we are not to describe our shepherds, as shepherds at this day really are, but as they may be conceived then to have been, when the best of men followed the employment. To carry this resemblance yet farther, it would not be amiss to give these shepherds some skill in astronomy, as far as it may be useful to that sort of life. And an air of piety to the gods should shine through the poem, which so visibly appears in all the

the works of antiquity: and it ought to preserve some relish of the old way of writing; the connection should be loose, the narrations and descriptions short, and the periods concise. Yet it is not sufficient that the sentences only be brief, the whole eclogue should be so too. For we cannot suppose poetry, in those days, to have been the business of men, but their recreation at vacant hours.

But with respect to the present age, nothing more conduces to make these compositions natural, than when some knowledge in rural affairs is discovered. This may be made to appear rather done by chance than on design, and sometimes is best shewn by inference; lest, by too much study to seem natural, we destroy that easy simplicity from whence arises the delight. For what is inviting, in this sort of poetry, proceeds not so much from the idea of that business, as of the tranquillity of a country life.

We must, therefore, use some illusion to render a pastoral delightful; and this consists in exposing the best side only of a shepherd's life, and in concealing its miseries. Nor is it enough to introduce shepherds discoursing together in a natural way, but a regard must be had to the subject, that it contain some particular beauty in itself, and that it be different in every eclogue. Besides, in each of them, a designed scene or prospect is to be presented to our view, which should likewise have its variety. This variety is obtained, in a great degree, by frequent comparisons, drawn from the most agreeable objects of the country; by interrogations to things inanimate; by beautiful digressions, but those short; sometimes by insisting a little on circumstances; and lastly, by elegant turns on the words, which renders the numbers extremely sweet and pleasing. As for the numbers themselves, though they are properly of the heroic measure, they should be the smoothest, the most easy, and flowing imaginable.

It is by rules, like these, we ought to judge a pastoral. And since the instructions given for any art are to be delivered as that art is in perfection, they must, in necessity, be derived from those in whom it is acknowledged so to be. It is, therefore, from the practice of Theocritus and Virgil (the only undisputed authors of pastoral) that the critics have drawn the foregoing notions concerning it.

Theocritus excels all others in nature and simplicity. The subjects of his Idyllia are purely pastoral; but he is not so exact in his persons, having introduced reapers and fishermen, as well as shepherds. He is apt to be too long in his descriptions, of which that of the cup, in the first pastoral, is a remarkable instance. In the manners he seems a little defective, for his swains are sometimes abusive and immodest, and, perhaps, too much inclining to rusticity; for instance, in his fourth and fifth idyllia. But it is enough that all others learned their excellencies from him, and that his dialect alone has a secret charm in it, which no other could ever attain.

Virgil, who copies Theocritus, refines upon his original; and in all points where judgment is principally concerned, he is much superior to his master. Tho' some of his subjects are not pastoral in themselves, but only seem so to be such, they have a wonderful variety in them, which the Greek was a stranger to. He exceeds him in regularity and brevity, and falls short of him in nothing but simplicity and propriety of style; the first of which, perhaps, was the fault of his age, and the last of his language.

Among the moderns, their success has been greatest, who have most endeavoured to make these antients their pattern. The most considerable genius appears in the famous Tasso and our Spenser, Tasso, in his *Aminto*, has as far excelled all the pastoral writers, as in his *Gierusalemme* he has out-done the epic poets of his country. But as this piece seems to have been the original of a new sort of poem, the pastoral comedy in Italy, it cannot so well be considered as a copy of the antients. Spenser's *Calendar*, in Mr. Dryden's opinion, is the most complete work of this kind, which any nation has produced ever since the time of Virgil. Not but that he may be thought imperfect in some few points. His eclogues are somewhat too long, if we compare them with the antients. He is, sometimes, too allegorical, and treats on matters of religion, in a pastoral style, as the Mantuan had done before him. He has employed the lyric measure, which is contrary to the practice of the old poets. His stanza is not still the same, nor always well chosen; this last may be the reason why his expression is sometimes not concise enough: for the tetralectic has obliged him to extend his sense to the

length of four lines, which would have been more closely confined in the couplet. In the manners, thoughts, and characters, he comes near to Theocritus himself; though, notwithstanding all the care he has taken, he is certainly inferior in his dialect: for the doric had its beauty and propriety in the time of Theocritus; it was used in part of Greece, and frequent in the mouths of many of the greatest persons; whereas the old english and country phrases of Spenser were either entirely obsolete, or spoken only by people of the lowest condition. As there is a difference between simplicity and rusticity, so the expression of simple thoughts should be plain, but not clownish. The addition he has made of a calendar to his eclogues is very beautiful; since by this, besides the general moral of innocence and simplicity, which is common to other authors of pastoral, he has one peculiar to himself; he compares human life to the several seasons, and at once exposes to his readers a view of the great and little worlds, in their various changes and aspects. Yet the scrupulous division of the pastorals into months has obliged him either to repeat the same description in other words, for three months together; or, when it was exhausted before, entirely to omit it: whence it comes to pass, that some of his eclogues (as the 6th, 8th, and 10th, for example) have nothing but their titles to distinguish them. The reason is evident, because the year has not that variety in it to furnish every month with a particular description, as it may every season.

PASTORAL STAFF, the same with crozier. See the article **CROZIER**.

PASTRY, that branch of cookery, which is chiefly taken up in making pies, pasties, cakes, &c.

PASTURE, or **PASTURE-LAND**, that reserved for feeding cattle.

Pasture-land is of such advantage to husbandry, that many prefer it even to corn-land, because of the small hazard and labour that attends it, and as it lays the foundation for most of the profit that is expected from the arable land, because of the manure the cattle afford which are fed upon it. Where dung is not to be bought, as is often the case in places distant from large towns, the farmer is forced to proportion his arable to his pasture-land, in such manner, that the cattle fed on the latter may be sufficient for a

supply of dung, so necessary for producing the fruits of the former.

Pasture-lands are of three kinds: 1. The uplands: these lie so high as not to be overflowed by rivers, or land-floods. 2. Those low lands which lie near rivers and fens. And 3. Those that lie near the sea.

Pasture-land requires the refreshment of dung, as well as the arable or corn-land; but there is to be a difference made in the laying it on and spreading it. A harrow performs the office of spreading the dung on ploughed lands; but the best contrivance for pastures, is, to lay the dung in small heaps, and draw over it a gate stuck full of bushes. All dung that is laid on pasture-land, must be laid on in winter, that the rains may wash its fatness into the ground before the sun scorches it, or evaporates its goodness. Fine mould mixed with the dung, and spread with it over the land, is very good for pastures; for it is washed down to the very roots of the grass, and gives them a new and fine soil just in those places where it is most wanted.

The best manure for pasture-land is the rotten bottoms of old hay-stacks; for these moulder away into a very rich soil, and are always full of vast quantities of seed, fallen at times from the hay, which all grow when spread on the ground: and thus new nourishment, and a new set of plants are given at once to the exhausted ground. But as particularly useful as this is for pasture-ground, it is as improper for corn-land, and should by no means ever be suffered to mix with the manure for those grounds; as it will then raise grass and other plants, which tho' of use in the pasture are weeds among the corn.

Admeasurement of PASTURE: See the article **ADMEASUREMENT**.

PASTURE OF PLANTS, a term used by Tull, for the nourishment they draw from the earth. See the articles **PLANT** and **VEGETATION**.

PASTY, in cookery, a preparation of venison, veal, lamb, or other meat; which being well boned, beaten to a pulp, and highly seasoned, is inclosed in a proper paste, and baked in an oven.

PATAGONIA, the most southern part of South America, extending from the mouth of Rio di la Plata, in 36° of South lat. to Cape Horn, in 55° 30'.

PATAGONULA, or **PATAGONICA**, in botany, a genus of the pentandria-monogynia

gynia class of plants, with a monopetalous flower, that has scarce any tube, and is divided into five oval and acute segments; the fruit is an oval acuminate capsule, placed on a very large cup, with oblong emarginated segments; which structure of the cup constitutes the essential distinction of the genus.

PATAI, a town of France, in the province of Orleans, fourteen miles north of Orleans.

PATAN, the capital of a province in the East Indies, situated two hundred miles north of Huegly in Bengal; east long. 89° , north lat. $27^{\circ} 30'$.

PATAVINITY, *patavinitas*, among critics, denotes a peculiarity of Livy's diction, derived from Patavium, or Padua, the place of his nativity; but wherein this patavinity consists, they are by no means agreed.

PATCHUCA, or **PATIOQUE**, a city of Mexico: west long. 103° , north lat. 21° , subject to Spain.

PATE, in fortification, a kind of platform, resembling what is called an horse-shoe; not always regular, but generally oval, encompassed only with a parapet, and having nothing to flank it. It is usually raised in marshy grounds, to cover the gate of a place.

PATE'E, or **PATTE'E**, in heraldry, a cross small in the center, and widening to the extremes, which are very broad. See plate CXCIV. fig. 6. which is a cross pattee, argent, upon a field sable.

PATELLA, in anatomy, a bone which covers the fore-part of the joint of the knee, called also rotula, and popularly the knee-pan. The patella is convex on the outside, and on the inside unequal, having an eminence and two depressions. Its substance is spongy, and consequently it is brittle; it is connected by tendons and ligaments to the tibia and the os femoris, which is the ligament by which it is connected to the thigh, and has a motion of ascent and descent in the flexion of the tibia. In infants and children it is cartilaginous.

Fracture of the PATELLA. The patella, or knee-pan, is much more subject to a transverse fracture than to one in any other direction. The longitudinal fracture of this bone happens more rarely, but when it does, is much more easily cured; because the fragments of the bone, in this case, generally keep in their right places, but when the bone is broken not only transversely, but into several

pieces, the case is yet more difficult and dangerous. The cure of this fracture, according to Heister, must be attempted in this manner: in a longitudinal or perpendicular fracture, the patient must be laid upon his back, and, extending the foot, the surgeon must replace the fragments on both sides with the pressure of his hands, binding them up carefully with the uniting bandage; which must be applied in this case in the same manner with that used in large wounds in the belly or forehead. But when the patella is broken transversely, or into several pieces, the patient being laid in the same posture, and extending his foot as before, the surgeon is with great care to endeavour with the palms of both his hands, assisted by his fingers and thumbs, to bring together and replace the fragments in their natural situation; and when that is done, they must be retained firmly together, by means of a plaster made in form of a half moon, or properly perforated, and then the foot and leg are to be bound up, and placed so that they cannot be easily moved; but to prevent the bone from being displaced again, the patient must not use his leg till after the ninth or tenth week. See the article FRACTURE.

PATELLA luxated. The patella is most usually luxated either on the internal or external side of the joint, though physicians give accounts of its being sometimes luxated both above and below it. Whenever the knee itself is perfectly luxated, the patella can scarce avoid being displaced at the same time, because of its strong connection to the thigh and to the tibia. See the article KNEE.

The reduction of a luxated patella is usually no great difficulty. The patient is to be laid flat on his back upon a table or bed, or upon an even floor, so that his leg may be pulled out straight by an assistant; when this is sufficiently extended, the surgeon must grasp the patella with his fingers, and afterwards, by the assistance of his hand, press it strongly into its proper place. This may be also possibly effected while the patient stands upright: when this is done, there remains nothing but carefully to bind up the part, and let the patient rest for some days; sometimes gently binding and extending his leg in the mean while, that it may not become stiff.

PATELLA, the **LIMPET**, is a genus of shell-fish, with a simple shell, of a conic or other gibbose figure, and a very wide opening

opening at the mouth or bottom; always applying itself firmly to some solid body, which serves it in the place of another shell: the animal inhabiting it is called limax. The summit of the limpet-shell is in some species acute, in others obtuse, and in some depressed, perforated, striated, fasciated, &c.

PATENT, in general, denotes something that stands open or expanded: thus a leaf is said to be patent when it stands almost at right angles with the stalk.

PATENT, or LETTERS-PATENT. See the article **LETTER**.

PATENT-GLOBES. See the article **GLOBE**.

PATENTEE, a person to whom the king has granted his letters-patent.

PATER PATRATUS, in roman antiquity, the principal person among the *feciales* or college of heralds. See the article **FECIALES**.

PATER NOSTER, the Lord's-prayer, so called from the two first words thereof in latin. It is also sometimes used for a chaplet or string of beads. And, in architecture, the same term is used for a sort of ornament cut in the form of beads, either oval or round, used on astragals, baguettes, &c.

PATER-NOSTRE'E, in heraldry, or a **CROSS-PATERNOSTRE'E**, is a cross made of beads.

PATERA, in roman antiquity, a goblet or vessel used by the Romans in their sacrifices; in which they offered their consecrated meats to the gods, and with which they made libations. The patera was of gold, silver, marble, brass, glass, or earth; and they used to inclose it in urns, with the ashes of the deceased, after it had served for the libations of wine and other liquors at the funeral.

The patera is an ornament in architecture, frequently seen in the doric frieze, and in the tympan of arches.

PATERNITY, the quality of a father.

PATH, in general, denotes the course or tract marked out or run over, by a body in motion. See **MOTION**.

Concerning the path of a satellite, or secondary planet, on an immoveable plane, Mr. Maclaurin has demonstrated the following propositions.

Prop. I. The path of the satellite, on an immoveable plane, is the epicycloid that is described by a given point in the plane of a circle, which revolves on a circular base; having its center in the center of the sun, and its diameter in the same proportion to the diameter of the revol-

ing circle, as the periodic time of the primary about the sun, to the time of the synodic revolution of the satellite about the primary: the tangent of the path is perpendicular to the right line that joins the satellite to the contact of the two circles; and the absolute velocity of the satellite is always as its distance from that contact.

Let T denote the periodic time of the primary about the sun, t the periodic time of the satellite about the primary. Let S (plate CXCIV. fig. 1.) represent the sun, Aa the orbit of the primary: upon the radius AS , take AE to AS as t is to T . From the center S , describe the circle EeZ ; and from the center A , the circle EMF . Let this circle EMF revolve on the other EeZ , as its base: then a point L , taken on the plane of the circle EMF , at the distance AL , equal to the distance of the satellite from the primary, shall describe the path of the satellite.

For suppose the circle EMF to move into the situation emf , the point A to a , L to l ; and let AL and al , produced, meet EMF and emf , in M and m . Upon the arc em take $er = EM$; then $Le ar = LEAM$. Let ar meet the circle cld , described from the center a , with the distance al , in q ; and because $Le aq = LEAL$, the angle eaq represents the elongation of the satellite from the sun at its first place L . Again, because $em (= er + rm) = eE + EM$, and $er = EM$, it follows, that $rm = eE$; and, consequently, $Lram : LeSE :: SE : AE :: T - t : t$; or, as the angular velocity of the satellite from the sun, to the angular velocity of the primary about the sun. But ESe is the angle described by the primary about the sun; consequently ram , or qal , is the simultaneous increment of the elongation of the satellite from the sun; l is its place when the primary comes to a ; and the epicycloid, described by l , is the path of the satellite.

Because the circle EMF moves on the point E , the direction of the motion of any point L , is perpendicular to EL ; or the tangent of the path, at any point L , is perpendicular to EL . The velocity of any point L , is as its distance EL ; and the motion of the primary A being supposed uniform, and represented by EA , the velocity of the satellite shall be represented by EL .

Prop. II. Upon AS (*ibid.*) take $AB : AS :: t : T$ (or $AB : AE :: AE : AS$); upon

upon the diameter EB describe the circle EKB , meeting EL in K ; take LO a third proportional to LK and LE , on the same side of L with LK ; and O shall be the center of the curvature at L of the path, and LO the ray of curvature.

Because EL and el are perpendicular to the path at the points L and l , let them be produced, and their ultimate intersection O shall be the center of curvature at L . Produce qe till it meet LE in V , join SV , and the angle $SeV = qea = LEA = SEV$; consequently the angle $eVE = eSE$, the angle $EVS = eSE$, and the angle $EVS = EeS$, and SV is ultimately perpendicular to EO . Now the angle EOe is ultimately to $EVe (= ESe)$ as EV to EO , that is (because $EV : EK :: ES : EB :: AS : AE$) as $EK \times AS$ to $EO \times AE$. But the angular motion of EL being equal to the angular motion of EA , while the circle EMF turns on the point E , LEl is therefore ultimately equal to $A Ea$, which is to ESe as SA to AE ; and EOe being to LEl as EL to LO , it follows that $EOe : ESe :: SA \times EL : AE \times LO :: EK \times SA : EO \times AE$. Therefore $EL : LO :: EK : EO$, and $EL : LK :: LO : EL$, or LK, LE and LO are in continued proportion. This theorem serves for determining the ray of curvature of epicycloids and cycloids of all sorts; only when the base Ee is a right line, AB vanishes, and EB becomes equal to EA .

Corol. I. When AL or AC is less than AB , then (because LO is always on the same side of the point L with LK) the path is concave towards S throughout. When $AC = AB$, the curvature at the conjunction vanishes, or the path has there a point of rectitude. When AC is greater than AB (or $AS \times \frac{tt}{TT}$), a portion of the path near the conjunction is convex towards S , because a part of the circle CLD falls within the circle BKE ; and when L comes to either of the intersections of these circles, the path hath a point of contrary flexure. If $AC = AE$, these points meet again, and form a cusp: and if $AC < AE$, the path hath a nodus; which last is the case of the innermost of the satellites of jupiter and saturn.

Corol. II. In the case of the moon, $tt : TT :: 1 : 178$; and $AB = \frac{1}{178} \times AS$:

but AC is about $\frac{1}{337} \times AS$; consequently, $AC < AB$, and the path of the moon is concave towards the sun throughout.

Prop. III. Let $AB : AS :: tt : TT$, and the force, by which the path of the satellite can be described on an immoveable plane, is always directed to the point B (*ibid.*) upon the ray AS , and is always measured by BL , the distance of the satellite from the point B , the gravity of the primary towards the sun being represented by BA .

We conceive the force by which this path could be described, on an immoveable plane, to be resolved into a force that acts in the direction LO , perpendicular to the path, but has no effect on the velocity of the satellite; and a force perpendicular to LO , that accelerates or retards the motion of the satellite. The former of these is measured by LK , the latter by BK , the gravity of the primary towards the sun being measured by AB . For the former is to the gravity of the primary towards S , as $\frac{EL^2}{LO}$ to $\frac{EA^2}{AS}$;

(those forces being directly as the squares of the velocities, and inversely as the rays of curvature;) that is, as LK to AB , by prop. II. Therefore the gravity of the primary being represented by AB , the former force will be measured by LK .

The second force that acts on the satellite in the direction of the tangent of its path, and accelerates or retards its motion, is as the fluxion of the velocity EL directly, and the fluxion of the time inversely. The fluxion of the time is

measured by $\frac{Aa}{EA}$ (Aa being the arc described by the primary, and EA the velocity with which it is described)

$= \frac{Ee}{EB} = \frac{rm}{EB} = \frac{lq \times AE}{EB \times AC}$ (supposing an and qu to be perpendiculars to el in n and u , because $lq : lu :: ac : an$, or $AC : AN$) $\frac{AE \times lu}{BE \times AN} = \frac{lu}{BK}$. Therefore

the force which is measured by lu , the fluxion of the velocity EL , or EL , divided by the fluxion of time, or $\frac{lu}{BK}$,

is measured by BK . The force, therefore, in the direction LE being measured by LK , and the force in the perpendicular

lar direction $K B$ by $K B$, the compounded force is measured by $L B$, and is directed from L to B .

It appears, from what has been demonstrated, that the path may be described by a force directed towards the point B (which is given upon the ray $A S$, but revolves along with this ray about S) or by any forces which, compounded together, generate a force tending to B , and always proportionable to $L B$, the distance of the satellite from B . Let $L H$ be equal and parallel to $A B$, and $A B H L$ shall be a parallelogram, and the force $L B$ may be compounded of $L H$ and $L A$; that is, the force $L B$ may be the result of a force $L H$ acting on the satellite, equal and parallel to $A B$, the gravity of the primary towards the sun, and of a force $L A$ tending to the primary, and equal to the gravity by which the satellite would describe the circle $C L D$ about the primary, in the same periodic time t , if the sun was away; because such a force is to the gravity of the primary towards the sun

(represented by $A B$) as $\frac{A L}{t t}$ to $\frac{A S}{T T}$ or

as $A L$ to $A S \times \frac{t t}{T T} = A B$.

Thus we arrive at the same conclusion which Sir Isaac Newton, more briefly, derived from an analysis of the motions of the satellite; that while the satellite gravitates towards the primary, if, at the same time, it be acted on by the same solar force as the primary, and with a parallel direction, it will revolve about the primary, in the same manner as if this last was at rest, and there was no solar action. These two forces, the gravitation towards the primary, and a force equal and parallel to the gravitation of the primary towards the sun, are exactly sufficient to account for the compounded motion of the satellite in its path, however complex a curved line it may appear to be. Nor is there any perturbation of the satellite's motion, but what arises from the inequality of the gravity of the satellite, and of the primary towards the sun, or from their not acting in parallel lines. If we should suppose them to move about their common center of gravity, while this is carried round the sun, or if we suppose the orbits to be elliptical, the conclusions will still be found consonant to what was more briefly deduced by this great author.

PATH of the moon, the tract described by the moon, while the earth describes its annual orbit. See *EARTH* and *MOON*.

The ingenious Mr. Neale having invented machines for illustrating this path of the moon, by means of which, the motion of that secondary planet, so difficult to be conceived by young students in astronomy, is rendered extremely easy and familiar, we shall here give the description of them. Fig. 2. plate CXCIV. n^o 1. represents the largest of these machines, containing the motion of the moon from the full to the new, and from the new to the full; and as the entire annual motion of that planet is only a repetition of the former, the machine is of the same utility as if it contained the whole path of the moon. $A B$ represents part of the earth's annual orbit; $D E F$, part of that of the moon; T , the earth; M , the moon; $f G g$, the path described by the index f ; S , the sun; $H L$, a circle divided into $29\frac{1}{2}$ equal parts, the number of days in a mean lunation; K , an index which moves on the center I , and points out the age of the moon. The machine is put in motion by the winch N ; and while the earth describes the part of its orbit $A B$, the moon describes the curve $F E D$, exhibiting her several phaenomena, as full, last quarter, new, first quarter, &c. Thus, when the moon is moved to E , the earth will be in C , exhibiting not only the phaenomena of a new moon, but also that of a solar eclipse. In this position, the young student will easily apprehend the reason why the moon is not visible, unless there be an eclipse of the sun, as the sun and moon are then in the same right line, and only the dark part of the moon is turned towards the earth. By continuing the motion from thence to the full, the reason why the moon appears partly dark and partly light, will be rendered very conspicuous; the light part of the moon, represented by the white part of the ball, gradually emerging from a cap as she moves from the new to the full. When the moon is at D or F , the earth will be at A or B , and exhibit the phaenomena of a full moon and lunar eclipse. In this position the whole white part of the ball will be turned without the cap and toward the sun; and therefore her whole face, which is turned towards the earth, will be illuminated, unless the sun's rays are intercepted by the earth, in which case there will be an eclipse of the moon.

By

By causing the moon to move from the full to the new, the reason of her decrease will be visible, the white part of the ball gradually immersing behind the cap, till she comes in opposition to the sun, and exhibits the phenomenon of a new moon. There is fixed an index near the stem of the moon, which shews her apparent motion in the ecliptic during her revolution round the earth, which is performed in a lunar month. By the help of this machine, an idea of the motion of the moon, and the curve she describes, may be obtained in an easy and entertaining manner. It will also appear evident, that her path is always concave towards the sun, notwithstanding her motion round the earth, an idea which, to beginners, has always been attended with difficulty.

N^o 2. *ib.* represents another of these machines containing the moon's motion during one lunation, or from one new moon to another; where S, is the sun; A B, part of the earth's orbit; C, the moon; D, the earth; *ab*, a circle graduated into $29\frac{1}{2}$ equal parts, the number of days in a mean lunar month; E, the index, shewing the moon's age on the quadrated circle *ab*; F, a button by which the machine is put in motion.

N^o 3. *ibid.* is another of these machines, representing the whole annual path of the moon; S, the sun; D, the moon; E, the earth; ABC, the annual path of the moon; HIKL, the orbit of the earth; *ab*, a circle graduated into $29\frac{1}{2}$, as in the other machines; F, the index shewing the moon's age; G, a button, whereby the machine is moved. The explanation we have given of n^o 1. will be sufficient for forming an idea of the other two.

PATH of the vertex, a term frequently used by Mr. Flamsteed, in his doctrine of the sphere, for a circle described by any point of the earth's surface, as the earth turns round its axis: this point is considered as vertical to the earth's center, and is the same with the vertex or zenith in the ptolemaic projection.

The semi-diameter of this path is always equal to the sine of the complement of the latitude of the point that describes it.

PATHETIC, whatever relates to the passions, or that is proper to excite or awake them. See the article **STYLE**.

In music, this term is used for something very moving, expressive, or passionate, and is capable of exciting pity, compas-

sion, anger, or the like. The chromatic genus, with its greater and lesser semitones, either ascending or descending, is very proper for the pathetic; as is also an artful management of discords, with a variety of motions now brisk, now languishing, now swift, now slow. Nieuwentyt mentions a musician of Venice, who excelled in the pathetic to such a degree, as to be able to play his auditors into distraction; he adds, that the great means he made use of, was the variety of his motions, &c.

PATHETIC NERVES, in anatomy, a pair of very small nerves which arise in the brain, and run to the trochlear muscle of the eye. These nerves have obtained the name pathetic, from their serving to move the eyes in the various passions.

PATHOGNOMONIC, *παθωγνωμονικός*, among physicians, an appellation for a symptom, or concurrence of symptoms, that are inseparable from a distemper, and are found in that only, and in no other.

PATHOLOGY, that part of medicine, which explains the nature of diseases, their causes and symptoms.

PATHOS, *πάθος*, a greek term, literally signifying passion, is sometimes used for the energy of a discourse, or its power to move the passions.

PATIENT, among physicians, a person under the direction of a physician or surgeon, in order to be cured of some disease.

PATIENTIÆ MUSCULUS, in anatomy, the levator scapulæ. See **LEVATOR**.

PATMOS, one of the least of the islands of the Archipelago, subject to the Turks: east long. 27° , and north lat. 37° .

PATNA, a city of the hither India, the capital of the territory of the same name, in the province of Bengal: east longit. 85° , and north lat. 26° .

PATANCE, in heraldry, is a cross flory at the ends; from which it differs only in this, that the ends instead of turning down like a fleur de lis, are extended somewhat in the pattee-form. See the article **FLORY**.

PATOWMAC, a great river of Virginia, which arises in the Apalachian mountains, and after separating Virginia from Maryland, falls into the bay of Chesapeake.

PATRANA, or **PASTRANA**, a town of Spain, in the province of New Castile, forty miles east of Madrid.

PATRAS, a city and port-town of European

Peopan Turkey, in the province of the Morea: east long. $21^{\circ} 30'$, and north lat. $38^{\circ} 20'$.

PATRES CONSCRIPTI, CONSCRIPT FATHERS. See the articles **CONSCRIPT** and **SENATOR**.

PATRIARCHS, among Christians, are ecclesiastical dignitaries, or bishops, so called from their paternal authority in the church. The power of patriarchs was not the same in all, but differed according to the different customs of countries, or the pleasures of kings and councils: thus the patriarch of Constantinople grew to be a patriarch over the patriarchs of Ephesus and Cæsarea, and was called the oecumenical and universal patriarch; and the patriarch of Alexandria had some prerogatives, which no other patriarch besides himself enjoyed, such as the right of consecrating and approving every single bishop under his jurisdiction. The general privileges of the patriarchate were these following; 1. The patriarchs ordained all the metropolitans under them; but they themselves were ordained by a diocesan synod. 2. They had the power of convening all their metropolitans and provincial bishops to a diocesan synod. 3. They had the privilege of receiving appeals from metropolitans and provincial synods, and of reversing their decrees. 4. They might enquire into the administration of metropolitans, and censure them in case of heresy or misdemeanor. 5. A patriarch had power to send a metropolitan into any part of his diocese as his commissioner, to hear and determine ecclesiastical causes in his name. 6. The metropolitans did nothing of moment without consulting the patriarchs. 7. It was the patriarch's office to publish both ecclesiastical and civil laws, so far as concerned the church. 8. They were all co-ordinate, and independent of one another.

The title of patriarch is still kept up in the greek church, the supreme head of which is the patriarch of Constantinople; who pays sometimes ten, sometimes twenty thousand crowns to the grand-seignor for his instalment.

PATRIARCHAL CROSS, in heraldry, is that where the shaft is twice crossed; the lower arms being longer than the upper ones. Plate CXCIV. fig. 7. is a patriarchal cross, gules, on a field argent.

PATRICIAN, among the antient Romans, a title given to the descendants

of the hundred, or, according to others, of the two hundred first senators chosen by Romulus, and by him called patres, fathers.

Romulus, says Kennet, as soon as his city was tolerably filled with inhabitants, made a distinction of the people, according to honour and quality, giving the better sort the name of patres or patricii, and the rest the common title of plebeii. To bind the two degrees more firmly together, he recommended to the patricians some of the plebeians, for them to protect and countenance; the former being styled patrons, and the last clients. In difficult cases, the patrons were always the counsellors of their clients, their advocates in judgments, and, in short, their advisers and overseers in all affairs whatsoever. On the other hand, the clients faithfully served the patrons, not only paying them all imaginable respect and deference; but, if occasion required, assisting them with money, towards defraying any extraordinary charges.

PATRIMONY, a right or estate inherited by a person from his ancestors.

The term patrimony has been also given to church estates or revenues, in which sense authors still say, the patrimony of the church of Rimini, Milan, &c. The church of Rome had patrimonies in France, Africa, Sicily and many other countries. To create the greater respect to the estates belonging to the church, it was usual to give their patrimonies the names of the saints they held in the highest veneration: thus the estate of the church of Ravenna was called the patrimony of St. Apollinarius; that of Milan, the patrimony of St. Ambrose; and the Estates of the roman church were called the patrimony of St. Peter in Abruzzo, the patrimony of St. Peter in Sicily, and the like.

What is now called St. Peter's patrimony is only the duchy of Castro, and the territory of Orvietto. See **CASTRO**, &c.

PATRINGTON, a market-town of York-shire, situated at the mouth of the Humber, fifty miles east of York.

PATRIPASSIANS, *patripassiani*, in church-history, a christian sect, who appeared about the latter end of the 11d century; so called from their ascribing the passion to the Father: for they asserted the unity of God in such a manner as to destroy all distinction of persons, and to make the Father and Son precisely the same; in which they were followed by the fabellians.

fabellians, and others. The author and head of the patripassians was Praxeas, a philosopher of Phrygia in Asia.

PATROL, in war, a round or march made by the guards, or watch, in the night-time, to observe what passes in the streets, and to secure the peace and tranquillity of a city or camp. The patrol generally consists of a body of five or six men, detached from a body on guard, and commanded by a serjeant.

PATRON, among the Romans, was an appellation given to a master who had freed his slave. As soon as the relation of master expired, that of patron began; for the Romans in giving the slaves their freedom, did not despoil themselves of all right and privileges in them; the law still subjected them to considerable services and duties towards their patrons, the neglect of which was very severely punished.

Patron was also a name which the people of Rome gave to some great man, under whose protection they usually put themselves; paying him all kinds of honour and respect, and denominating themselves his clients; while the patron, on his side, granted them his credit and protection.

PATRON, in the church of Rome, a saint, whose name a person bears, or under whose protection he is put, and whom he takes particular care to invoke: or a saint, in whose name a church or order is founded.

PATRON, in the canon and common law, is a person, who having the advowson of a parsonage, vicarage, or the like spiritual promotion, belonging to his manor, hath, on that account, the gift and disposition of the benefice, and may present to it whenever it becomes vacant. The patron's right of disposing of a benefice, originally arises either from the patron, or his ancestors, &c. being the founders or builders of the church; from their having given lands for the maintenance thereof; or, from the church's being built on their ground; and, frequently, from all three together.

PATRONAGE, the right of disposing of a church or benefice, and enjoying several other privileges, such as having the honourable rights of the church being interred in the chancel, &c. See the article **ADVOWSON** and **PATRON**.

Arms of PATRONAGE, in heraldry, are those on the top of which are some marks of subjection and dependance: thus the

city of Paris bears the fleurs de lis in chief, to shew her subjection to the king; and the cardinals, on the top of their arms, bear those of the pope, who gave them the hat, to shew that they are his creatures.

PATRONYMIC, among grammarians, is applied to such names of men and women as are derived from those of parents or ancestors.

Patronymics are derived, 1. From the father, as Pelides, *i. e.* Achilles the son of Peleus. 2. From the mother, as Philyrides, *i. e.* Chiron the son of Philyra. 3. From the grandfather on the father's side, as Æacides, *i. e.* Achilles the grandson of Æacus. 4. From the grandfather by the mother's side, as Atlantiades, *i. e.* Mercury the grandson of Atlas. And, 5. From kings and founders of nations, as Romulidæ, *i. e.* the Romans from their founder king Romulus.

The termination of greek and latin patronymics are chiefly four, *viz. des*, of which we have examples above; *as*, as Thaumantias, *i. e.* Iris the daughter of Thaumias; *is*, as Atlantis, *i. e.* Electra the daughter of Atlas; and *ne*, as Nerine, the daughter of Nereus. Of these terminations *des* is masculine; and *as*, *is*, and *ne*, feminine: *des* and *ne* are of the first declension, *as* and *is* of the third.

PATTI, a port-town of Sicily, in the province of Val Demona, situated on the Mediterranean, forty-six miles west of Messina.

PAU, a city of France, in the province of Gascony and territory of Bearn, situated on the river Gave, thirty-six miles south-east of Bayonne.

PAVAGE, in our old law-books, signifies money paid towards paving the streets or highway.

PAVAN, a grave kind of dance, borrowed from the Spaniards, wherein the performers make a kind of wheel, or tail, before each other, like that of a peacock; whence the name.

PAVEMENT, a layer of stone, or other matter, serving to cover and strengthen the ground of divers places for the more commodious walking on.

In England the pavements of the grand streets, &c. are usually of pebbles; courts, stables, kitchens, halls, churches, &c. are paved usually with tiles, bricks, flags, or fire stones; and sometimes with a kind of free-stone and rag-stone. In

France the public roads, streets, courts, &c. are paved with gres, a kind of free-stone. In Venice the streets, &c. are paved with brick; churches sometimes with marble, and sometimes with mosaic work. In Amsterdam and the chief cities of Holland, they call their brick pavement the burger-masters pavement, to distinguish it from the stone or flint pavement, which is usually in the middle of the street, serving for the passage of their horses, carts, coaches, and other carriages; the brick borders being designed for the passage of people on foot.

Pavements of free-stone, flints, and flags, in streets, &c. are laid dry, that is, are retained in a bed of sand; those of courts, stables, ground-rooms, &c. are laid in mortar of lime and sand, or in lime and cement, especially if there be vaults or cellars underneath: some masons, after laying a floor dry, especially of brick, spread a thin mortar over it, sweeping it backwards and forwards, to fill up the joints. Thirty-two statute bricks laid flat, pave a yard square; sixty-four of edge-wise. See the article BRICK.

The square tiles used in paving, called paving-bricks, are of various sizes, from six to twelve inches square. Pavements of churches, &c. frequently consist of stones of different colours chiefly black and white; and of several forms, but chiefly square and lozenges, artfully disposed.

PAVEMENT of terrace, is that which serves for the covering of a platform, whether it be over a vault, or on a wooden-floor. Those over vaults are usually stones squared, and bedded in lead. Those on wood are either stones with beds, for bridges; tiles for ceilings in rooms; or lays of mortar, made of cement and lime, with flints or bricks laid flat, as is still practised by people in the east and south, on the tops of their houses.

Mosaic PAVEMENT. See MOSAIC-WORK.

Tesselated PAVEMENT. See TESSELATED.

PAVETTA, in botany, a genus of the tetrandria-monogynia class of plants, with a monopetalous funnel-fashioned flower, and a monospermous berry for its fruit.

PAVIA, a city of Italy, in the duchy of Milan, capital of the Pavese, the see of a bishop, and university, situated in east long. $9^{\circ} 40'$, and north lat. $45^{\circ} 15'$.

PAVIA, in botany, a genus of the octandria-monogynia class of plants, the co-

rolla whereof consists of five roundish petals, the upper ones being longer than the rest, and all of them inserted into the cup by very long unguis; the fruit is coriaceous, turbinate, obtusely tetragonal, made up of four valves, and containing four cells; the seeds are solitary and roundish.

PAVICULA, among the Romans, a rammer or instrument for beating down or levelling a spot of ground, consisting of a block of wood, a foot long, and half a foot thick, with a long handle.

PAVILION, in architecture, signifies a kind of turret or building, usually insulated, and contained under a single roof; sometimes square, and sometimes in form of a dome: thus called from the resemblance of its roof to a tent.

Pavilions are sometimes also projecting pieces, in the front of a building, marking the middle thereof; sometimes the pavilion flanks a corner, in which case it is called an angular pavilion. The Louvre is flanked with four pavilions: the pavilions are usually higher than the rest of the building. There are pavilions built in gardens, commonly called summer-houses, pleasure houses, &c. Some castles or forts consist only of a single pavilion.

PAVILION, in military affairs, signifies a tent raised on posts, to lodge under in the summer time. See the article TENT.

PAVILION is also sometimes applied to flags, colours, ensigns, standards, banners, &c. See the articles FLAG, &c.

PAVILION, in heraldry, denotes a covering in form of a tent, which invests or wraps up the armories of divers kings and sovereigns, depending only on God and their sword.

The pavilion consists of two parts; the top which is the chapeau, or coronet; and the curtain, which makes the mantle. None but sovereign monarchs, according to the french heralds, may bear the pavilion entire, and in all its parts. Those who are elective, or have any dependance, say the heralds, must take off the head, and retain nothing but the curtains.

PAVILIONS, among jewellers, the undersides and corners of the brilliants, lying between the girdle and the collet.

St. PAUL de Leon, a port-town of France, in the province of Britany, situated at the entrance of the English channel, in west long. 4° , and north lat. 49° .

St. PAUL, a town of France, in the province

vince of Dauphiné, situated on the east side of the river Rhone, twelve miles north of Orange.

St. PAUL is also a city of Brasil, in South America, in the province of St. Vincent, situated in west long. 50°, and south lat. 23° 30'.

PAULIONISTS, in church-history, christian heretics of the III^d century, disciples of Paul Samosatensis, bishop of Antioch, who denied Christ's divinity, maintaining that when we call him the Son of God, we do not thereby mean that he is really and truly God; but only that he was so perfect a man, and so superior in virtue to all others, that he had this name given him by way of eminence. The paulionists continued to the VIth century, notwithstanding the prohibition of the emperor Constantine the great, who forbade them and other heretics to hold public assemblies.

PAULICIANS, christian heretics of the VIIth century, disciples of one Constantine, a native of Armenia, and a favourer of the errors of Manes; who, as the name manichees was become odious to all nations, gave those of his sect the title of Paulicians, on pretence that they followed only the doctrine of St. Paul. One of their most detestable maxims was, not to give alms to the poor, that they might not contribute to the support of creatures, who were the works of the bad god. See the article MANICHEES.

PAULLINIA, in botany, a genus of the octandria-digynia class of plants, the corolla whereof consists of four oblong petals, of an obversely oval figure, patent, and twice as large at the cup: the fruit is a large triquetrous capsule, formed of three valves, and containing three cells; the seeds are single, and of an oval figure.

PAUNCH, PANTCH, or PANCH, on board a ship, are broad clouts, woven of thrums and sinnets together, to save things from galling and fretting; therefore they are made fast to the main and fore-yards for that purpose.

PAVO, in zoology. See PEACOCK.

PAVO, in astronomy, a southern constellation, called the peacock.

PAUPER, in law. See the article FORMA PAUPERIS.

PAURAEDRASTYLÆ, in natural history, the name of a genus of perfect crystals, with double pyramids, and no intermediate column, composed of twelve

planes, or two hexangular pyramids, joined base to base. See CRYSTAL.

PAUSANIA, in grecian antiquity, a festival, in which were solemn games, wherein nobody contended but free-born Spartans; in honour of Pausanias, the spartan general, under whose conduct the Greeks overcame Mardonius, in the famous battle at Plateæ: there was always an oration in honour of Pausanias.

PAUSARY, *pausarius*, in roman antiquity, an officer, who, in the solemn pomps or processions of the goddess Isis, directed the stops or pauses. In these ceremonies there were frequent stands at places prepared for the purpose, wherein the statues of Isis and Anubis were set down; much after the manner of the resting-places in the procession of the holy sacrament, in the romish church: the rest were called mansiones.

PAUSARY was also the name of an officer in the roman gallies, who gave the signal to the rowers, and marked the times and pauses, to the end they might act in concert, and row all together: this was done with a musical instrument.

PAUSE, a stop or cessation of speaking, singing, playing, or the like. The use of pointing in grammar, is to make proper pauses, in certain places. There is a pause in the middle of each verse; in an hemistich it is called a rest or repose. See the article REST.

PAUSE, in music, a character of silence, or rest, called also by some a mute figure; because it shews that some part or person is to be silent, while the rest continue the song. Pauses are used either for the sake of some fugue or imitation, or to give a breathing time; or to give room for another voice, &c. to answer what this part sung, as in dialogues, echoes, &c.

General pause denotes a general cessation or silence of all the parts; and demi-pause, a cessation for the time of half a measure. They also say, pause of a minim, pause of a semibreve, long pause, pauses of a croma and semicroma, being names given by the Italians, to express the different values or duration of pauses for the signs of which, see the article CHARACTER.

PAW, PATTE, in heraldry, the fore-foot of a beast, cut off short. If the leg be cut off, it is called gambe. Lions paws are much used in armory.

PAW, in the manege. A horse is said to paw the ground, when his leg, being
either

either tired or painful, he does not rest it upon the ground, and fears to hurt himself as he walks.

PAWLE, in a ship, a small piece of iron bolted to one end of the beams of the deck, close to the capstan; but yet so easily, as that it can turn about. Its use is to stop the capstan from turning back, by being made to catch hold of the whelps: they therefore say, heave a pawle; that is, heave a little more, for the pawle to get hold of the whelps: and this they call pawling the capstan.

PAWN, a pledge lodged for the security of the payment of a sum of money borrowed. As the party that pawns the goods, has a general property therein, they cannot be forfeited by the person that hath them in pawn, for any offence of his; neither can they be taken in execution for his debt: on the other hand, where goods are repawned for money, if, after judgment is obtained against the pawner for debt, the goods in the pawnee's hands, are not liable to execution until such time as the money lent be paid to the pawnee. He that borrows money on a pawn, is to have again the pledge, when he repays the same; or he may bring an action for detaining it; and his very tender of the money revests the special property in him. Likewise it has been held, that where a broker refuses, on tendering the money, to redeliver the goods, he thereupon shall be indicted. In case goods are pawned for lent money, and no day fixed for their redemption, they are said to be redeemable at any time during the pawner's life; and though they may not be redeemed after his death, they may after the death of the pawnee. Where the pawn is redeemable on a certain day, it must be strictly observed, or upon failure of payment it may be sold. Also it is the common practice of the brokers, when no day is fixed for redemption, not to stay longer than a year for their money, at the expiration of which time they usually sell the goods.

PAWN, among miners, a pledge put into the bar-master's hand, at the time when the plaintiff causes the bar-master to arrest the mine.

PAWN-BROKER. See the article **BROKER**.

PAX, **PEACE**. See the article **PEACE**.

PAY, in the sea-language. The seamen say, pay more cable, when they mean to let out more cable.

PAYING, among seamen. When the seams of a ship are laid over with a coat

of hot pitch, it is called paying her; and when this is done with canvas, parceling: also when, after she is graved, and the soil burned off, a new coat of tallow and soap, or one of train-oil, rosin, and brimstone boiled together, is put on her, that is also called paying of a ship.

PAYMENT, the discharge of a debt, either by money really told, or by bills of exchange, &c. See the article **DEBT**.

The manner of payment shall be directed by him that pays the money, and not by the receiver of it. If money be paid before the time, it is, in law, accounted a payment at the day; and here the payment of a lesser sum may be a satisfaction for the whole, though not otherwise.

PAZ, a city of Peru in South America, situated on the east side of the lake Titicaca: west long. 66°, and south lat. 18°.

PEA, *pisum*, in botany. See **PISUM**.

PEACE, *pax*, in its general signification, stands in contradistinction to war.

Peace, in our law-books, signifies a quiet and inoffensive behaviour towards the king and his people. It is observed, that all authority for keeping the peace comes originally from the king, who is the supreme officer or magistrate for the preservation of it. Also the lord-chancellor and judges of the king's bench, &c. have a general power to keep the peace over all the realm; as have likewise all courts of record within their own precincts, and sheriffs of counties, justices of the peace, constables, &c. No person may break the peace without being liable to punishment; and where any person is in danger of harm, or some bodily prejudice from another, on oath made thereof before a justice of the peace, or other magistrate, he may be secured by bond or recognizance, which is commonly called binding to the peace.

PEACE of the king, is that peace or security, both of life and goods, which the king promises to all his subjects, or others that are under his protection. There is also the peace of the king's highways, which is to be free from all annoyance and molestation; to which may be added the peace of the plough, whereby both the plough and plough-cattle are secured from distresses; and fairs are said to have their peace, so that no person may be troubled there for debts contracted elsewhere.

PEACH, in botany. See **PERSICA**.

PEACOCK, *pavo*, in ornithology, a genus of birds, of the order of the gallinae.

the characters of which are these : there are four toes on each foot, and the head is ornamented with an erect crest of feathers.

Of this genus there are several species, distinguished by their different colours. The male of the common kind is, perhaps, the most gaudy of all the bird-kind ; the length and beauty of whose tail, and the various forms in which the creature carries it, are sufficiently known and admired.

PEACOCK-FISH, *pavo*, in ichthyology, a very beautiful species of labrus, with the pectoral fins round at the extremity, and so called from its beautiful variety of colours, as red, blue, yellow, brown, &c. It grows sometimes to more than three pounds in weight. See plate CXCIV. fig. 9.

PEAK, a rocky mountainous country in the west of Derbyshire, remarkable for its mines of lead and iron, &c.

PEAN, in heraldry, is when the field of a coat of arms is fable, and the powderings or.

PEAR, *pyrus*, in botany. See PYRUS.

PEARCH, in ichthyology, the same with perca. See the article PERCA.

PEARCH-FISHING. See FISHING.

PEARCH-GLUE, the name of a kind of glue of remarkable strength and purity, made from the skins of pearches. See the article GLUE.

PEARL, *margarita*, in natural history, a hard, white, shining body, usually roundish, found in a testaceous fish resembling an oyster.

Pearls, though esteemed of the number of gems of our jewellers, and highly valued, not only at this time, but in all ages, proceed only from a distemper in the creature that produces them, analogous to the bezoars, and other stony concretions in several animals of other kinds ; and what the antients imagined to be a drop of dew concentered into a pearl in the body of the pearl-fish, which they supposed rose from the bottom to the surface of the water to receive it, is nothing more than the water destined to form and enlarge the shell, bursting from the vessels destined to carry it to the parts of the shell it should have formed, and by that means producing these little concretions.

The fish in which these are usually produced is the East-Indian pearl-oyster, as it is commonly, though not very properly, called : it has a very large and

broad shell of the bivalve kind, sometimes measuring twelve or fourteen inches over, but those of eight inches are more frequent : it is not very deep ; on the outside it is of a dusky brown, and within of a very beautiful white, with tinges of several other colours, as exposed in different directions to the light. Besides this shell, there are many others that are found to produce pearls ; as the common oyster, the muscle, the pinna marina, and several others, the pearls of which are often very good, but those of the true indian berberi, or pearl-oyster, are in general superior to all. The small or seed-pearls, also called ounce pearls, from their being sold by the ounce, and not by tale, are vastly the most numerous and common ; but as in diamonds, among the multitudes of small ones, there are smaller numbers of larger found, so in pearls there are larger and larger kinds ; but as they increase in size, they are proportionably less frequent, and this is one reason of their great price. We have scotch pearls frequently as big as a little tare, some as big as a large pea, and some few of the size of a horse-bean ; but these are usually of a bad shape, and of little value in proportion to their weight. Philip II. of Spain had a pearl perfect in its shape and colour, and of the size of a pigeon's egg. De Boot tells us of one in the emperor Rudolph's possession, of thirty carats weight ; Tavernier mentions one in Persia, for which that crown paid to the amount of more than a hundred thousand pounds sterling ; and we are told of Cleopatra's possessing one worth fourscore thousand pounds of our money ; pearls of such vast sizes as these, are as rare as the great diamonds ; but, as among diamonds, there are a considerable number, which though very short of this, are of great value. The finest, and what is called the true shape of the pearl, is a perfect round ; but if pearls of a considerable size are of the shape of a pear, as is not unfrequently the case, they are not less valued, as they serve for earrings and other ornaments. Their colour ought to be a pure white, and that not a dead and lifeless, but a clear and brilliant one ; they must be perfectly free from any foulness, spot or stain, and their surfaces must be naturally smooth and glossy, for they bring their natural polish with them, which art is not able to improve.

All pearls are formed of the matter of the shell, and consist of a number of coats spread with perfect regularity one over another, in the manner of the several coats of an onion, or like the several strata of the stones found in the bladders or stomachs of animals, only much thinner. It is observed that the whitest pearls, brought into Europe, contract a yellowness on the surface, which no art can recover; but there is a way of taking off the whole outer coat of the pearl, in which case the second surface, which is as bright as the originally external one, preserves its beauty for a long time. This, however, is a very nice operation to perform, and at best greatly diminishes the value of the pearl by taking from its size and weight. It is said that those pearls which have somewhat of a yellowish cast never alter, nor ever lose their lustre; and if this be true, the ancients, who preferred those which were a little yellowish to the perfectly white ones, had great reason on their side.

The little protuberances, like warts, which we see rising in hemispherical figures from the surfaces of shells, are evidently of the pearl-kind, only not detached: when these are of a good colour, and tolerably large, our workmen cut them out, and make something of them under the name of wens of pearls. This valuable article of commerce is not the product of any peculiar part of the world. The East-Indies and America produce the pearl shell-fish in abundance, and it is found with good pearls in many parts of Europe. The coasts of the island Ceylon afford pearls superior to those of all the East in the beauty of their colour, but there are no very large ones found there. The Persian gulph abounds with the pearl-fish, and fisheries are established on the coasts of the several islands in it. In America, there are fisheries in the gulph of Mexico, and along the coast of Terra Firma, all which yield considerable advantage. The european pearls are principally found on the coasts of Scotland, and the neighbouring parts. The pearls met with in apothecaries shops are of various kinds, all that are unfit for the jewellers purposes coming thither; consequently some of the rough and ill shaped pearls, and those of bad colours, are at times to be met with there; though the generality are what are only too small for working into toys, &c. These, after levigation, make an im-

palpable powder, which is much talked of as an ingredient in what is called pearl-cordials; but most of the apothecaries use only levigated oyster-shell under its name. Great praises have, indeed, been given to pearls as cordials and sudorifics; but without any great foundation: for they seem mere alkaline absorbents, and as good as crabs-eyes, or oyster-shells, but not better.

Diamonds, pearls, rubies, and all other jewels, are imported duty free, only levigated or beaten pearls pay, on importation, 7½d. the ounce troy; and draw back, on exportation, 6^s 10^d.

Manner of fishing for PEARLS in the East-Indies. There are two seasons for pearl-fishing, the first is in March and April, and the last in August and September; and the more rain there falls in the year, the more plentiful are these fisheries. At the beginning of the season there are sometimes two hundred and fifty barks on the banks; the larger barks having two divers, and the smaller one. Each bark puts off from shore at sun-rise, with a land-breeze, which never fails; and returns again by a sea-breeze, which succeeds it about noon. As soon as the barks arrive at the place where the fish lie, and have cast anchor, each diver binds a stone six inches thick, and a foot long, under his body; which serves him as ballast, prevents his being driven away by the motion of the water, and enables him to walk more steadily under the waves. They also tie another very heavy stone to one foot, by which they are very speedily sent to the bottom of the sea: and as the oysters are usually firmly fastened to the rocks, they arm their hands with leather-mittens to prevent their being wounded in pulling them violently off; but this task some perform with an iron-rake. In the last place, each diver carries down with him a large net in the manner of a sack, tied to his neck by a long cord, the other end of which is fastened to the side of the bark. This net is to hold the oysters gathered from the rock, and the cord is to pull up the diver when his bag is full, or he wants air. See DIVING.

In this equipage he sometimes precipitates himself sixty feet under water; and as he has no time to lose, he no sooner arrives at the bottom, than he begins to run from side to side tearing up all the oysters he meets with, and cramming them into his budget.

At whatever depth the divers are, the light is so great, that they easily see whatever passes in the sea; and to their great consternation sometimes perceive monstrous fishes, from which all their address in mudding the water, &c. will not always save them, but they unhappily become their prey: and of all the dangers of the fishery, this is one of the greatest and most usual. The best divers will keep under water near half an hour, and the rest do not stay less than a quarter. During this time they hold their breath without the use of oils, or any other liquors; only acquiring the habit by long practice. When they find themselves freightened they pull the rope to which the bag is fastened, and hold fast by it with both hands; when those in the bark, taking the signal, heave them up into the air, and unload them of their fish, which is sometimes five hundred oysters, and sometimes not above fifty. Some of the divers need a moment's respite to recover breath; others jump in again instantly, continuing this violent exercise without intermission for several hours.

On the shore they unload their barks, and lay their oysters in an infinite number of little pits dug in the sand four or five feet square; raising heaps of sand over them to the height of a man; and in this condition they are left, till the rain, wind, and sun have obliged them to open, which soon kills them: upon this the flesh rots and dries, and the pearls, thus disengaged, fall into the pit, on their taking out the shells. After clearing the pits of the grosser filth, they sift the sand several times in order to find the pearls: but whatever care they take, they always lose a great many. After cleaning and drying the pearls, they are passed through a kind of sieve, according to their sizes: the smallest are then sold as seed-pearls, and the rest put up to auction, and sold to the highest bidder.

Artificial PEARLS, are made by reducing seed-pearls to a paste, by means of a chemical preparation called mercurial water, making the beads in silver-moulds, boring them with a hog's bristle, and drying them in a closed glass in the sun.

Beads, in imitation of pearls, are also made of wax, and covered with the scales of several kinds of fishes.

Mother of PEARL, is the shell not of the pearl-oyster, but of another sea-fish of the oyster-kind. This shell on the inside

is extremely smooth, and of the whiteness and water of pearl itself; and it has the same lustre on the outside, after the first laminæ or scales have been cleared off with aquafortis, and the lapidaries mill. Mother of pearl is used in inlaid-works, and in several toys, as snuff-boxes, &c.

PEARL, in heraldry, in blazoning with precious stones, is the same with argent, or white.

PEARL, PIN, or WEB, in medicine, an excrescence growing in the eye. See the article UNGUIS.

PEARL-FISH, *rhombus*. See RHOMBUS.

PEARL-FORT, a fortress in dutch Brabant, situated on the river Scheld, four miles north-west of Antwerp.

PEARL-ISLANDS, several small islands situated in the bay of Panama: west long. 81° , and between 7° and 9° of north lat.

PEAT, a kind of turf used for fuel in several countries. See the article MOSS. In Holland they have a way of charring peat, so that it may serve for fuel in several chemical operations; but this manner of charring is not yet known in several countries where, perhaps, peat might be found.

PEBBLES, the name of a genus of fossils, distinguished from the flints and homochroa, by their having a variety of colours. These are defined to be stones, composed of a crystalline matter, debased by earths of various kinds in the same species, and then subject to veins, clouds, and other variegations; usually formed by incrustations round a central nucleus, but sometimes the effect of a simple concretion, and veined like the agates, by the disposition the motion of the fluid they were formed in gave their differently coloured substances. Dr. Hill observes, that the variety of pebbles, were it of England alone, is so great, that a hasty describer would be apt to make almost as many species as he saw specimens. A careful examination will teach us, however, to distinguish them into a certain number of essentially different species, to which all the rest may be referred, as accidental variations. When we find the same substances and the same colours, or those resulting from a mixture of the same, such as nature frequently makes in a number of stones, we shall easily be able to determine, that these are all of the same species, though in different appearances; and that whether matter be disposed in one or two, or

in twenty crusts, laid regularly round a central nucleus, or thrown without a nucleus into irregular lines, or finally, blended into a sort of uniform mass.

These are the three states in which we are liable to find every species of pebble; for if it have been most naturally and regularly formed by incrustation round a central nucleus, we find that ever the same in the same species, and the crusts not less regular and certain. If the whole have been more hastily formed, and have been the result only of one simple concretion, if that has happened while its different substances were all moist and thin, they have blended together and made a mixed mass of the joint-colour of them all; but if they have been something harder when this has happened, and too far concreted to diffuse wholly among one another, they are found thrown together in irregular veins. These are the natural differences of all the pebbles; and having regard to these in the several variegations, all the known pebbles may be reduced to thirty-four species; for an account of each, we refer the curious to Hill's history of fossils, p. 512, seq.

There are many people of opinion, that the swallowing of pebbles is very beneficial to health, in helping the stomach to digest its food; and a pebble-posset is an old woman's medicine in the cholic in many parts of England. They usually order the small white stones to be picked up out of gravel-walks for this purpose, and eat them in large quantities in some sort of spoon-meat, of which milk is an ingredient; however this custom may still prevail, we have no physician's practice to warrant it, and could produce instances of much mischief resulting from swallowing of pebbles; a markable one whereof, the reader may find recorded in the philosophical transactions, n^o 253.

PECCANT, in medicine, a term used for those humours of the body which offend either by their quantity or quality.

PECK, a measure of capacity, four of which make a bushel. See the articles **MEASURE** and **BUSHEL**.

PECORA, in natural history, a class of quadrupeds, the characters of which are, that they have no foreteeth in the upper-jaw; those in the lower are six, or eight; the feet are covered with divided hoofs; and the teats are two, and are situated in the groin.

To this class of animals belong the dro-

medary, the camel, the moschus, the cervus or stag, the capra or goat, the sheep, the ox, &c.

PECQUENCOUR, a town of the french Netherlands, in the province of Hainalt, five miles east of Doway.

PECTEN, a genus of bivalve shells, shutting close all-round, and usually of a depressed form; but it is always aurited, or having one or two processes, called ears, issuing from the head of the shell near the hinge.

The greater part of the pectens are striated, or costated; the ribs or ridges running in straight lines like the teeth of a comb; whence the name.

There are a great many elegant species of this genus; as the ducal mantle-shell, or pecten variegated with red and yellow, and a few ribs; the irish scallop-shell, or red pecten variegated with white, &c.

PECTORAL, an epithet for medicines good for disorders of the breast and lungs. The ordinary intentions of these medicines is either to attenuate or thicken the humours of these parts, and to render them fit to be expectorated or spit out. See the article **EXPECTORANTS**.

The pectoral decoction, as altered by the college of physicians, is as follows: take barley, raisins stoned, figs, of each two ounces; of liquorice-root, half an ounce; of water, two quarts. Boil the water first with the barley, then add the raisins, and afterwards, toward the latter end of the decoction, the figs and liquorice; the decoction is fully ended when one quart only of liquor is left after straining.

PECTORALIS, in anatomy, a pair of muscles which possesses almost all the whole breast, and serves to move the arm forwards. This muscle has its origin in the clavicle, the sternum, and all the true ribs, and its termination at four fingers breadth below the head of the humerus. Its action is probably much assisted by the action of the coraco-brachialis, and that of the deltoides by that of the upper part of this pectoral muscle, which is usually a kind of distinct muscle. Naturalists observe a singular mark of providence, in the size and strength of the pectoral muscle in different animals. It is by the action of this muscle, that the flying of birds is chiefly performed; and therefore much larger and stronger in birds, than in any animals not made for flight.

PECTORIS os, in anatomy. See the article **STERNUM**.

PECULATE, in civil law, the crime of imbezzling the public money, by a person intrusted with the receipt, management, or custody thereof.

This term is also used by civilians for a theft, whether the thing be public, fiscal, sacred, or religious.

PECULIAR, in the canon law, signifies a particular parish or church that has jurisdiction within itself for granting probates of wills, and administrations, exempt from the ordinary or bishop's courts. The king's chapel is a royal peculiar, exempt from all spiritual jurisdiction, and reserved to the visitation and immediate government of the king himself. There is likewise the archbishop's peculiar; for it is an antient privilege of the see of Canterbury, that wherever any manors or advowsons belong to it, they forthwith become exempt from the ordinary, and are reputed peculiars: there are fifty-seven such peculiars in the see of Canterbury.

Besides these, there are some peculiars belonging to deans, chapters, and prebendaries, which are only exempted from the jurisdiction of the archdeacon: these are derived from the bishop, who may visit them, and to whom there lies an appeal.

Court of **PECULIARS**, is a court in which the affairs belonging to peculiars are transacted.

PECULIUM, the stock or estate which a person, in the power of another, as a slave, may acquire by his industry.

In the romish church, peculium denotes the goods which each religious reserves and possesses to himself.

PECUNIA, **MONEY**. See **MONEY**.

In our old law books pecunia denotes an estate in goods and chattels, as well as in money.

PECUNIARY, a term applied to the punishment of offenders by mulct or fine.

PEDAGOGUE, or **PÆDAGOGUE**, παιδαγωγός, a tutor or master, to whom is committed the discipline, and direction of a scholar, to be instructed in grammar and other arts.

PEDALS, the largest pipes of an organ, so called because played and stopped with the foot. The pedals are made square, and of wood; they are usually thirteen in number. They are of modern invention, and serve to carry the sounds an octave deeper than the rest. See **ORGAN**.

PEDANEUS, in the civil law, a petty

judge who has no formal seat of justice, but hears causes standing, and without any tribunal. The pedanei were established in the see of every province, by the emperor Zeno: and Justinian erected seven of them at Constantinople, in manner of an office, granting them power to judge in any sum as high as three hundred crowns.

PEDANT, is used for a rough unpolished man of letters, who makes an impertinent use of the sciences, and abounds in unseasonable criticisms and observations. Dacier defines a pedant, a person who has more reading than good sense; and Malebranche describes him, as a man full of false erudition, who makes a parade of his knowledge, and is ever quoting some greek or latin author, or hunting back to a remote etymology: hence,

PEDANTRY, the quality or manner of a pedant.

PEDARIAN, in roman antiquity, those senators who signified their votes by their feet, not their tongues; that is, such as walked over to the side of those whose opinion they approved of, in divisions of the house. See the article **SENATE**.

PEDENA, or **PENDENA**, a town of Istria in the territory of Venice, situated twenty-eight miles south-east of Cabo de Istria.

PEDESTAL, in architecture, the lowest part of an order of columns, being that which sustains the column, and serves it as a foot or stand. See **COLUMN**.

The pedestal consists of three principal parts, *viz.* a square, trunk, or dye, which makes the body; a cornice, the head; and a base, the foot of the pedestal. The pedestal is properly an appendage to a column, not an essential part of it; though M. Le Clerc thinks it essential to a complete order.

There are as many kinds of pedestals as there are of orders of columns, *viz.* the tuscan, doric, ionic, corinthian, and composite: some say that the height of the pedestal in each order, ought to be a third part of the whole column, comprehending the base and capital, and their proper adjuncts, as architrave, frieze, and cornice, a fourth part of the same pillar. Indeed Vignola, and most of the moderns, make the pedestal and all its ornaments in all the orders one third of the height of the column, including the base and capital; but some deviate from this rule. See the article **BASE**, &c.

The whole height of the tuscan column, comprehending the architrave, frieze and cornice, being divided into nine parts, two of these, according to Vitruvius, go to the height of the pedestal; which is by him described in two different forms, one of which is plain, having only a plinth for the base, and another for the capital: the height of each of these plinths is one-sixth of the whole height of the pedestal, and the projecture of these plinths is one-sixth of their height. In the pedestal that he describes of the other form, he also divides the whole height of the pedestal into six parts, one of which goes to the base, and one to the capital. Palladio and Scamozzi make the tuscan pedestal three modules high, Vignola five. See TUSCAN.

For the proportions of the doric pedestal, see the article DORIC.

And for the proportions of the ionic pedestal, see the article IONIC.

The corinthian pedestal is the richest and most delicate of all. The proportions of this pedestal are also given already under the article CORINTHIAN ORDER.

Vitruvius divides the whole height of the composite column into thirteen parts, making the height of the pedestal three of those parts. Vignola makes the composite pedestal of the same height with the corinthian, viz. seven modules; Scamozzi, six modules two minutes; Palladio, six modules seven minutes; in the goldsmith's arch, seven modules eight minutes. Its members in Vignola are the same with those of the corinthian, but with this difference, that whereas these are most of them enriched with carvings in the corinthian, they are all plain in the composite, and there is also a difference in the profiles of the base and cornice in the two orders. Daviler observes, that the generality of architects use tables or pannels, either in relievo or creux in the dyes of pedestals, without any regard to the character of the order: those in relievo he observes are only suitable to the tuscan and doric; the three others must be indented, which he says is a thing the antients never practised, as being contrary to the rules of solidity and strength.

Pedestals acquire other denominations, as those following: 1. Square pedestal, is that whose height and width are equal, as that of the arch of the lions at Verona, of the corinthian order; and such some

followers of Vitruvius, as Serlio, Philander, &c. have given to their tuscan orders. 2. Double pedestal, is that which supports two columns, and has more breadth than height. 3. Continued pedestal, is one which supports a row of columns without any break or interruption, as those which sustain the fluted columns of the palace of the Tuilleries, on the garden-side.

PEDESTALS of statues, are such as serve to support statues or figures. Vignola observes, that there is no part of architecture more arbitrary, and in which more liberty may be taken, than in the pedestals of statues; there being no rules or laws prescribed by antiquity, nor any settled even by the moderns. There being then no settled proportion for these pedestals, the height depends on the situation, and the figure that they sustain: when on the ground, the pedestal is usually two thirds or two fifths of that of the statue; the more massive the statue is the stronger the pedestal must be. Their form and character, &c. are to be extraordinary and ingenious, far from the regularity and simplicity of the pedestals of columns. The same author gives a multiplicity of forms, as oval, triangular, multangular, &c.

PEDIZÆUS, in anatomy, the second of the extensor muscles of the foot, having its origin in the lower part of the perone and annular ligament; and being divided into four tendons, which are inserted into the external part of the first articulation of the four toes. Its use is to extend the foot, together with the first of the extensors, called the extensor communis.

PEDICLE, among botanists, that part of a stalk which immediately sustains the leaf of a flower or a fruit, and is commonly called a foot-stalk.

PEDICULARIS, RED RATTLE, or LOUSE-WORT, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof consists of a single ringent petal; the tube is oblong and gibbous; the upper lip galeated, erect, compressed, and emarginated; the under one is patent, plane, semitrifid, and obtuse; the fruit is a roundish, acuminate capsule; the seeds are numerous, roundish, compressed and covered. This plant is of a cooling and drying nature, whence it is recommended in fistulas and other sinous ulcers. It also

also stops hæmorrhages and the menses.

PEDICULARIS MORBUS, the same with phthiriasis. See **PTHIRIASIS**.

PEDICULUS, LOUSE, in zoology, a genus of insects, the body of which is lobated at the sides; the legs are six, serving only for walking; and the eyes are two, and are simple.

Most animals are infested with lice, or insects which feed upon them: thus sheep have one species, oxen another, &c. and mankind are not free from them; for besides the common kind, whose natural habitation is in the heads of children, there is another kind called the crab-louse, whose natural residence is about the pubes. Authors also reckon the death-watch among the number of lice.

PEDILUVIUM, a bathing of the feet.

This bath may be prepared of the same ingredients with other baths. It may either consist of light, pure water alone; or, to correct the qualities of heavy and hard water, a lixivium or bran of wheat or chamomile-flowers may be added.

Pediluvium is highly expedient for the purposes of derivation in those diseases which arise from the congestions of the humours to the head and breast, produced by spasms of the inferior parts, and especially of the hypochondria. Among this kind, besides lethargic diseases, we may reckon almost all disorders of the head, such as madness, melancholy, cephalæas, hemicranias, the clavus hystericus, vertigo's, toothachs, pains of the ears, a gutta rosacea; inflammations and defluxions of saline humours on the eyes, immoderate hæmorrhages from the nose, and long watchings. Of this kind are also some disorders which affect the breast, such as convulsive asthmas, dyspnœas arising from a plethora, palpitations of the heart, dry coughs, and spitings of blood. Besides, baths for the feet in consequence of their singular efficacy in relaxing spasms, are highly beneficial in spasmodic and convulsive disorders, in pains, cardialgias, colics, especially of the hæmorrhoidal kind, gripes produced by the stone, and inflations of the stomach.

It is to be observed, that pediluvium produces more happy effects, if before it is used the quantity of blood is lessened by venesection in the feet: it should be used about bed-time; and the feet kept warm till the patient goes to bed, by which means perspiration all over the body is increased.

PEDIGREE. See the article **DESCENT**.

PEDIMENT, in architecture, is a kind of low pinnacle, serving to crown an ordonnance, or finish a frontispiece, and is placed as an ornament over gates, doors, windows, niches, altars, &c. being ordinarily of a triangular form, but sometimes forming an arch of a circle. The parts of a pediment are the tympanum and the cornice, which crowns it, and the entablature, which serves it as a base, or scale. Architects have taken a great deal of liberty in the form of this member; nor do they vary less as to the proportion of the pediment. The most beautiful, according to Daviler, is that where its height is about one fifth of the length of its base.

The pediment is usually triangular, and sometimes an equilateral triangle, called also a pointed pediment; it is sometimes circular, though M. Felibien observes, that we have no instance of round pediments in the antique, besides those in the chapels of the rotundo. Sometimes its upper cornice is divided into three or four sides, or right lines: sometimes the cornice is cut or open a-top, which is an abuse introduced by the moderns, particularly Michael Angelo; for the design of this part over doors, windows, &c. being chiefly to shelter those underneath from the rain, to leave it open in the middle is to frustrate its end. Sometimes the pediment is formed of a couple of scrolls or wreaths like two consoles joined together; sometimes again it is without a base, or its lower cornice is cut out, all but what is bestowed on two columns or pilasters, and on these is raised an arch or sweep, instead of an entablature, of which Serlio gives an instance in the antique in a corinthian gate at Foligny, in Umbria; and Daviler a modern one in the church of St. Peter at Rome.

Under this kind of pediments come those little arched corniches, which form pediments over doors and windows, supported by two consoles, instead either of entablature or columns.

Sometimes the pediment is made double, *i. e.* a less pediment is made in the tympanum of a larger, on account of some projecture in the middle, as the frontispiece of the church of the great Jesus at Rome; but this is accounted an abuse in architecture, though authorised by very good buildings, as the large pavilion of the louvre, where the cary-

atides

atides support three pediments, one in another: sometimes the tympanum of the pediment is cut out, or left open to let in light, as is seen under the portico of the capitol at Rome; lastly, this open pediment is sometimes triangular, and enriched with sculpture, as roses, leaves, &c. as is found in most of the gothic churches.

M. Le Clerc observes, that the modillions in the cornice of the pediment should always answer exactly over those of the entablature. Indeed Vitruvius says, that the antients did not allow of any modillions at all in pediments. M. Le Clerc also observes, that the cornice which serves the pediment as a base, should have no cymatium, by reason the cymatium of the rest of the entablature, when it meets the pediment, passes over it. This change of determination occasions a considerable difficulty; the cymatium in this case appearing too broad in the turn of the angle, to remedy which, architects have recourse to several expedients. A pointed pediment may crown three arches, but a circular pediment can only crown agreeably. There should never be used more than two tympana over each other in the same frontispiece, and even where there are two, it would be proper to have the lower circular, and the upper pointed.

PEDIR, a town in the island of Sumatra, in the East-Indies, situated in east long. 94° lat. 5°.

PEDOMETER, or **PODOMETER**, the same with **PERAMBULATOR**. See the article **PERAMBULATOR**.

PEDRERO, **PETERERO**, or **PATERERO**, a small piece of ordnance, used on board ships, for the discharging of nails, broken iron, or partridge shot, on an enemy attempting to board. See **ORDNANCE**. They are generally open at the breech, and their chamber made to take out, to be loaded that way, instead of at the muzzle.

PEDUNCLE, among botanists, the same with **pedicle**. See the article **PEDICLE**.

PEDUNCULI CEREBELLI, in anatomy, three medullary processes of the cerebellum, whereby that part is joined to the medulla oblongata. See the article **CEREBELLUM**.

The first of these processes ascends from the cerebellum towards the testes, and forms what is called the *valvula magna* of the brain; the second forms the annu-

lar prominence of Willis; and the third descends to the spinal marrow.

PEE, in mining, is used for the place where two veins meet and cross one another.

PEEBLES, or **PEBLIS**, a town of Scotland, capital of the shire of Tweedale, situated on the river Tweed, twenty-two miles south of Edinburgh.

PEEK, in the sea-language, is a word used in various senses. Thus the anchor is said to be a-peek, when the ship being about to weigh comes over her anchor in such a manner that the cable hangs perpendicularly betwixt the hause and the anchor. To heave a-peek is to bring the peek so as that the anchor may hang a-peek. A ship is said to ride a-peek, when lying with her main and fore-yards hoisted up, one end of her yards is brought down to the shrouds, and the other raised up an end; which is chiefly done when she lies in rivers, lest other ships falling foul of the yards should break them. Riding a-broad peek, denotes much the same, excepting that the yards are only raised to half the height.

Peek is also used for a room in the hold, extending from the bits forward to the stem: in this room men of war keep their powder, and merchant-men their victuals.

PEER, in general, signifies an equal, or one of the same rank and station: hence in the acts of some councils we find, these words, with the consent of our peers, bishops, abbots, &c. Afterwards the same term was applied to the vassals or tenants of the same lord, who were called peers, because they were all equal in condition, and obliged to serve and attend him in his courts; and peers in fiefs, because they all held fiefs of the same lord. The term peers is now applied to those who are impannelled in an inquest upon a person for convicting or acquitting him of any offence laid to his charge; and the reason why the jury is so called, is, because by the common law, and the custom of this kingdom, every person is to be tried by his peers or equals, a lord by the lords, and a commoner by commoners. See the article **JURY**.

PEER of the realm, a noble lord who has a seat and vote in the house of lords, which is also called the house of peers. These lords are called peers, because, though there is a distinction of degrees in our nobility, yet in public actions they

are equal, as in their votes in parliament, and in trying any nobleman, or other person impeached by the commons, &c. See the article PARLIAMENT.

All the peers who have a right to sit and vote in parliament, are to be summoned at least twenty days before the trial of a peer, indicted for treason or felony: the method of proceeding in which, is, after the indictment is found, the king, by commission under the great seal, appoints one of the peers, and generally the lord chancellor, to be lord high steward, who in these cases sits as judge. In order to bring the indictment before him, a certiorari is issued out of the court of chancery; and another writ also issues for bringing up the prisoner, a precept being made for that purpose by the lord high steward, assigning a day, and the place of trial, and for summoning the peers, twelve of whom are at least to be present, and as many more as choose to be present. The day of trial being come, and the lord high steward being seated in his usual state, after the commission is read, and the particular ceremonies are over, his lordship declares to the prisoner at the bar, the cause of their assembly, assures him of justice, and at the same time encourages him to answer without fear; on which the indictment is read over, and the prisoner arraigned; when after hearing all the evidence produced for the king, and the prisoner's answer, the prisoner is ordered to withdraw from the bar, when the lords go to some place by themselves to consider of the evidence; and afterwards being returned, in order to give their verdict, the lord high steward openly demands of the lords one by one, beginning with the puisne lord, whether the prisoner, calling him by his name, be guilty of the crime for which he is arraigned; when laying their right hand on their left breast, they separately answer either guilty or not guilty, upon their honour; and if he be found guilty by a majority of votes more than twelve, he is brought to the bar again, when the lord high steward acquaints the prisoner with the verdict of his peers, and passes sentence and judgment accordingly. It has been adjudged, that where such trial is by commission, as above, the lord high steward, after a verdict given, may take time to advise upon it, and his office continues till he passes judgment.

A peer is not to be put upon any inquest, even though the cause has a relation to two peers: but in trials, where any peer is either plaintiff or defendant, there must be two or more knights returned on the jury. Where a peer is defendant in a court of equity, he is not to be sworn to his answer, but it may be upon his honour, as in the trial of peers: however when a peer is to answer to interrogatories, or to make an affidavit, or is to be examined as a witness, he is to be sworn. For the other privileges of the peers, see the articles NOBILITY, PARLIAMENT, &c.

PEERS of France, are twelve great lords of that kingdom, of which six are dukes, and six counts; and of these, six are ecclesiastics, and six laymen: thus, the archbishop of Rheims, and the bishop of Laon and Langres are dukes and peers, and the bishops of Chalon on the Marn, Noyons, and Beauvais, are counts and peers. The dukes of Burgundy, Normandy, and Aquitaine, are lay peers and dukes; and the counts of Flanders, Champagne, and Toulouse, lay peers and counts. These peers still assist at the coronation of kings, either in person or by their representatives, where each performs the functions attached to his respective dignity: but as the six lay peerages are all at present united to the crown except that of the count of Flanders; six lords of the first quality are chosen to represent them: but the ecclesiastical peers usually assist in person. At present, the title of peer is bestowed on every lord whose estate is erected into a peerage, the number of which is uncertain, as it depends entirely on the king.

PEER, in building. See the article *PIER*. *PEERESS*, a woman who is noble by descent, creation, or marriage.

If a peeress, by descent or creation, marries a person under the degree of nobility, she still continues noble: but if she obtains that dignity only by marriage, she loses it, on her afterwards marrying a commoner; yet, by the courtesy of England, she always retains the title of her nobility. No peeress can be arrested for debt or trespass; for though, on account of their sex, peeresses cannot sit in the house of lords, yet they enjoy the privileges of peers, and therefore all peeresses by birth, are to be tried by their peers.

PEEVIT,

PEEVIT, or **BLACK-CAP**, in ornithology, the grey larus, with a black head. See the article **LARUS**.

This is a very elegant species: its size is about that of the common tame pigeon; the head is small; and the eyes bright, their iris is of a pale, hazel colour; the verges of the eye-lids are red, and they are surrounded with a fine, white plumage; the beak is nearly an inch in length, it is of a fine, bright scarlet, and is a little bent downwards; the legs are slender; their colour is a blood-red; the claws are black, and the toe behind is very short and small.

PEGANUM, **WILD RUE**, or **HARMEL**, in botany, a genus of the polyandria-monogynia class of plants, the flower of which consists of five oval petals; and its fruit is a trilocular capsule containing a great many small seeds.

This herb is said to have an inebriating and soporific quality.

PEGASUS, in astronomy, a constellation of the northern hemisphere, in form of a flying horse, said by different authors to contain 19, 20, and 93 stars.

PEGMATES, in antiquity, a kind of gladiators, who fought on scaffolds erected on purpose. See **GLADIATORS**.

PEGNITS, a river of Franconia, in Germany, which joins its waters with the Regnitz a little below Nuremburg.

PEGU, the capital of the kingdom of Pegu, and situated upon a river of the same name, in 97° east long. and north lat. $17^{\circ} 30'$.

The kingdom of Pegu is extended along the east side of the bay of Bengal.

PEINE, a town of lower Saxony, fourteen miles west of Brunswick.

PEKIN, the metropolis of the empire of China, is situated in east long. 111° , and north lat. 40° .

It is about twenty miles in circumference, and is said to contain 2,000,000 of people.

PELAGIÆ CONCHÆ, in natural history, such shell-fish as always reside in the deep parts of the sea, or those remote from land.

PELAGIANS, a christian sect who appeared about the latter end of the fourth, or the beginning of the fifth century.

Pelagius, the author of this sect, was born in Wales, and his name was Morgan, which in the welsh language signifies sea-born; from whence he had his latin name Pelagius. Some of our antient historians pretend that he was

abbot of Bangor: but this is impossible, because the british monasteries were of a later date.

St. Austin gives him the character of a very pious man, and a christian of no vulgar rank: according to the same father, he travelled to Rome, where he associated himself with persons of the greatest learning and figure, and wrote his commentaries on St. Paul's Epistles, and his letters to Melania and Demetrius; but being charged with heresy, he left Rome, and went into Africa, and from thence to Jerusalem, where he settled. He died somewhere in the east, but where is uncertain. He

was charged with maintaining the following doctrines: 1. That Adam was by nature mortal, and whether he had sinned or not, would certainly have died.

2. That the consequences of Adam's sin were confined to his own person.

3. That new-born infants are in the same condition with Adam before the fall.

4. That the law qualified men for the kingdom of heaven, and was founded upon equal promises with the gospel.

5. That the general resurrection of the dead does not follow in virtue of our Saviour's resurrection.

6. That the grace of God is given according to our merits.

7. That this grace is not granted for the performance of every moral act; the liberty of the will, and information in points of duty being sufficient, &c. Pelagius's sentiments were condemned by several councils in Africa, and by a synod at Antioch.

There was also a sect of semi-pelagians; who, with the orthodox, allowed of original sin; but denied that the liberty of the will could be so far impaired thereby, that men could not of themselves do something, which might induce God to afford his grace to one more than another: and as to election, they held, that it depended on our perseverance; God choosing only such to eternal life, as continued stedfast in the faith.

PELECANUS, in ornithology, a name sometimes given to the platea, or spoon-bill, as well as to the pelican, properly so called. See **PLATEA** and **PELICAN**.

PELECOIDES, in geometry, a figure in form of an hatchet: such is the figure $B C D A$, plate **CXCV**. fig. 3. contained under the two inverted quadrantal arcs $A B$ and $A D$, and the semi-circle $B C D$. The area of the pelecoïdes is demonstrated to be equal to the square $A C$, and that again to the parallelogram $E B$. It

It is equal to the square A C, because it wants of the square on the left hand the two segments A B and A C, which are equal to the two segments B C and C D, by which it exceeds on the right hand.

PELICAN, *pelicanus*, in ornithology, a genus of birds, of the order of the anseres, the beak of which is very long, crooked, and unguiculated at the extremity: its sides are not denticulated, and the anterior part of the head towards the throat is naked. See **ORNITHOLOGY**.

To this genus belong the pelican, properly so called, with a bag at the throat, the cormorant, and shag. See the articles **CORMORANT** and **SHAG**.

Mr. Edwards describes a pelican brought from the Cape of Good-Hope, which seemed to him to be more than double the size of the largest swan. He tells us, he saw its keeper put his head into the bag, or pouch, under the bill, and that another man's head might have been put in with it.

PELICAN, in chemistry, a kind of double glass-vessel, used in distilling liquors by circulation: it consists of a cucurbit and alembic-head, with two tubes bending into the cucurbit again. See plate **CXCVI**. fig. 1. n° 1.

But as such vessels are not easily procurable, a simple sort, consisting only of a bolt-head with a long neck, into which the neck of another glass-vessel is inverted, and the juncture well luted, as it must also be in the former, may be seen *ib.* n° 2.

The term pelican is also given to an instrument, used by surgeons for drawing teeth; and likewise for an antient piece of ordnance, carrying a ball of six pounds.

PELISA, a town of lower Hungary, subject to the house of Austria, thirteen miles west of Buda.

PELLETS, in heraldry, those roundles that are black, called also ogreselles and gun-stones, and by the French *tortaux de sable*.

PELLICLE, among physicians, &c. denotes a thin film, or fragment of a membrane.

When any liquor is evaporated in a gentle heat, till a pellicle arise at top, it is called an evaporation to a pellicle; wherein there is just liquor enough left, to keep the salts in fusion.

PELOSO, a town in the kingdom of Naples, thirty-five miles west of Barri.

PELLS, or *clerk of the PELLs*. See the article **CLERK**.

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PELLUCID, the same with diaphanous, or transparent. See **DIAPHANOUS**.

PELTA, *πελτη*, in antiquity, a small light sort of buckler. See **BUCKLER**.

PELVIS, in anatomy, the lower part of the cavity of the abdomen, thus called from its resemblance to a basin, or ewer, in latin called pelvis. It is formed by the ossa ilia and ischia, the os sacrum, the os coccygis, and the ossa pubis. See the article **INNOMINATA OSSA**.

The pelvis is much larger in women than in men, to give room for the growth, &c. of the foetus.

PELVIS of the kidneys, is a membranaceous cavity in the kidneys, which sends out several processes called the tubuli of the pelvis, and surrounds the renal papillæ. See **KIDNEYS** and **URETERS**.

PELUSIUM, a city of Egypt, now called Damietta. See **DAMIETTA**.

PEMBRIDGE, a market-town of Herefordshire, thirteen miles north-west of Hereford.

PEMBROKE, the capital of Pembroke-shire, in south Wales: west long. 5°, north lat. 51° 45'. This town sends two members to parliament.

PEN, a little instrument usually formed of a quill; serving to write withal.

Pens are also sometimes made of silver, brass, or iron.

Dutch PENS, are made of quills that have passed through hot ashes, to take off the grosser fat and moisture, and render them more transparent.

Fountain-PEN, is a pen made of silver, brass, &c. contrived to contain a considerable quantity of ink, and let it flow out by gentle degrees, so as to supply the writer a long time without being under the necessity of taking fresh ink. The fountain-pen is composed of several pieces, as in plate **CXCVI**. fig. 2. where the middle piece F carries the pen, which is screwed into the inside of a little pipe, which again is soldered to another pipe of the same bigness as the lid G; in which lid is soldered a male screw, for screwing on the cover, as also for stopping a little hole at the place, and hindering the ink from passing through it. At the other end of the piece F is a little pipe, on the outside of which the top-cover H may be screwed. In the cover there goes a port craion, which is to be screwed into the last-mentioned pipe, in order to stop the end of the pipe, into which the ink is to be poured by a funnel.

nel. To use the pen, the cover G must be taken off, and the pen a little shaken, to make the ink run more freely.

PEN, or PENSTOCK. See PENSTOCK.

PENANCE, a punishment, either voluntary or imposed by authority, for the faults a person has committed. Penance is one of the seven sacraments of the romish church. Besides fasting, alms, abstinence, and the like, which are the general conditions of penance; there are others of a more particular kind, as the repeating a certain number of ave-marys, pater-nosters, and credos, wearing a hair-shirt, and giving one's self a certain number of stripes. In Italy and Spain it is usual to see christians almost naked, loaded with chains and a cross, and lashing themselves at every step.

The manner of public penance in the romish church is as follows: the penitent comes into the church in a very plain and modest garb; if he be under excommunication, he kneels without the church-door; but if not, within the door. The congregation being assembled, the penitentiary priest sits in a chair in the middle of the nave of the church; and the penitent kneels before him, begging with a loud voice that his sins may be forgiven him: the priest answers with a short remonstrance, and enjoins him such penance as he thinks proper. He then takes the penitent by the right hand, and leads him to the church-door, where he says; you are turned out of the church for the sins you have committed, in like manner as Adam, for his disobedience, was driven from Paradise; and then the church-door is shut against him. When the penitent has completed the penance enjoined him, he returns back to the penitentiary, with a certificate thereof signed by the minister of his parish, and on the day of absolution, presents himself upon his knees at the church-door, with an unlighted taper in his hand. Prayers being ended, the priest goes to the church-door, and makes a pretty long exhortation to the penitent; which being done, he takes him by the hand, and leads him into the church. If the penitent be under excommunication, he must kneel before the priest, who strikes him several times on the shoulders with a whip made of cords.

Penance, in our canon-law, is an ecclesiastical punishment chiefly adjudged to the sin of fornication. The punish-

ment is thus described by the canons: the delinquent is to stand in the church-porch on some Sunday bare-headed and bare-foot, in a white sheet, with a white wand in his hand, bewailing himself, and begging every one to pray for him; then he is to enter the church, and falling down, is to kiss the ground; and at last is to be placed on an eminence in the middle of the church, over-against the minister, who is to declare the foulness of his crime, which is odious to God, and scandalous to the congregation. If the crime be not notorious, the canons allow the punishment to be commuted at the parties request for a pecuniary mulct, for the benefit of the poor, &c.

PENÆA, in botany, a plant of the tetrandria-monogynia class, with a monopetalous campaniform flower; and a quadrangular capsule for its fruit, containing four cells, with two oblong seeds in each.

This plant has been erroneously supposed to have produced the sarcocolla of the shops. See SARCOCOLLA.

PENATES, in roman antiquity, a kind of tutelar deities, either of countries or particular houses; in which last sense, they differed in nothing from the lares. See the article LARES.

The penates were properly the tutelar gods of the Trojans, and were only adopted by the Romans, who gave them the title of penates.

PENCE, or *Peter-PENCE*. See PETER.

PENCIL, an instrument used by painters for laying on their colours. Pencils are of various kinds, and made of various materials; the larger sorts are made of boars bristles, the thick ends of which are bound to a stick, bigger or less according to the uses they are designed for: these, when large, are called brushes. The finer sorts of pencils are made of camels, badgers, and squirrels-hair, and of the down of swans; these are tied at the upper end with a piece of strong thread, and inclosed in the barrel of a quill.

All good pencils on being drawn between the lips come to a fine point.

PENCIL is also an instrument used in drawing, writing, &c. made of long pieces of black-lead, or red-chalk, placed in a groove cut in a slip of cedar, on which other pieces of cedar being glued, the whole is planed round, and one of the ends being cut to a point, it is fit for use.

These

These pencils, on their importation, pay a duty of 2s. $4\frac{72\frac{1}{2}}{100}$ d. the gross, and draw back, on exportation, 2s. $1\frac{87\frac{1}{2}}{100}$ d.

PENDANT, an ornament hanging at the ear, frequently consisting of diamonds, pearls, and other precious stones.

The pendants of the European ladies are extremely small, when compared with those worn both by men and women in the East-Indies; among whom it is the fashion to lengthen out the ears, and to enlarge the hole made in them, by putting in pendants set with stones of the size of saucers. Pyrard informs us, that the queen of Calicut, and other ladies of her court, have their ears by this means weighed down to their breasts, and that the holes in them were large enough to pass the hand through. This they imagine a great beauty, and therefore the common people are not allowed to have their ears stretched above the length of three fingers. In the West-Indies, the Mexicans and other nations, not only hang pendants at their ears; but bore holes in their lips and nostrils, and hang pendants to them.

PENDANTS, in heraldry, parts hanging down from the label, to the number of three, four, five, or six at most, resembling the drops in the doric frieze. When they are more than three, they must be specified in blazoning.

PENDANTS, of a ship, are those streamers or long colours which are split and divided into two parts ending in points, and hung at the head of masts, or at the yard-arm ends.

PENDANT feathers, with falconers, are those feathers that grow behind the thighs of an hawk.

PENDANTS, among florists, the same with apices, or antheræ. See the articles **ANTHERÆ** and **STAMINA**.

PENDENNIS, a castle in Cornwall, situated on Falmouth-bay, fifty miles south-west of Launceston.

PENDENTIVE, in architecture, the whole body of a vault suspended out of the perpendicular of the walls, and bearing against the arch-boutants: or according to Daviler, it is the portion of a vault between the arches of a dome, usually enriched with sculpture.

The pendentives are generally of brick or soft stone; but care is to be taken, that the couches or beds of masonry, be always laid level, and in right lines

proceeding from the sweep whence the rise was taken: the joints too must be made as small as possible, to save the necessity of filling them up with wood, or of using much mortar.

PENDULOUS, a term applied to any thing that bends or hangs downwards: thus, the flowers, whose slender stalks are not able to sustain their heads upright, are called pendulous flowers. See the articles **BOTANY** and **FLOWER**.

PENDULUM, in mechanics, denotes any heavy body, so suspended as that it may vibrate or swing, backwards and forwards, about some fixed point, by the force of gravity. See **GRAVITY**.

The vibrations of a pendulum are called its oscillations. See **OSCILLATION**.

A pendulum, therefore, is any body, B, (plate CXCVI. fig. 3. n^o 1.) suspended upon, and moving about a fixed point, A, as a center.

The nature of a pendulum consists in the following particulars: 1. The times of the vibrations of a pendulum, in very small arches, are all equal. 2. The velocity of the bob, in the lowest point, will be nearly as the length of the chord of the arch which it describes in the descent. 3. The times of vibration in different pendulums, AB, AC, are as the square roots of the times of their vibrations. 4. The time of one vibration is to the time of the descent, through half the length of the pendulum, as the circumference of a circle to its diameter. 5. Whence the length of a pendulum, vibrating seconds, will be found 39.2 inches nearly; and that of an half second pendulum 9.8 inches. 6. An uniform homogeneous body BG (*ibid.* n^o 2.) as a rod, staff, &c. which is one third part longer than a pendulum AD, will vibrate in the same time with it.

From these properties of the pendulum we may discern its use as an universal chronometer, or regulator of time, as it is used in clocks, and such like machines. By this instrument also we can measure the distance of a ship, by measuring the interval of time between the fire and the sound of the gun; also the distance of a cloud, by numbering the seconds, or half-seconds, between the lightning and thunder. Thus, suppose between the lightning and thunder, we number 10 seconds; then, because sound passes through 1142 feet in one second, we have the distance of the cloud equal to 11420 feet. Again, the height of any room,

14 f 2 or

or other object, may be measured by a pendulum vibrating from the top thereof. Thus, suppose a pendulum from the height of a room vibrates once in three seconds; then say, as 1 is to the square of 3. *viz.* 9, so is 39.2 to 352.8 feet, the height required. Lastly, by the pendulum we discover the different force of gravity on diverse parts of the earth's surface, and thence the true figure of the earth. See the article EARTH.

When pendulums were first applied to clocks, they were made very short; and, the arches of the circle being large, the time of vibration through different arches, could not in that case be equal; to effect which, the pendulum was contrived to vibrate in the arch of a cycloid, by making it play between two semi-cycloids C B, C D, (*ibid.* n^o 3.) whereby it describes the cycloid B E A D; the property of which curve is, that a body vibrating in it, will describe all its arches, great or small, in equal times.

In all that has been hitherto said, the power of gravity has been supposed constantly the same. But, if the said power varies, the lengths of pendulums must vary in the same proportion, in order that they may vibrate in equal times; for we have shewn, that the ratio of the times of vibration and descent through half the lengths is given, and consequently the times of vibration and descent through the whole length is given: But the times of vibration are supposed equal, therefore the times of descent through the lengths of the pendulum are equal. But bodies descending through unequal spaces, in equal times, are impelled by powers that are as the spaces described, that is, the powers of gravity are as the lengths of the pendulums.

The greatest inconvenience attending this most useful instrument is, that it is constantly liable to an alteration of its length, from the effects of heat and cold, which very sensibly expand and contract all metalline bodies. See the article HEAT.

To remedy this inconvenience, the common method is by applying the bob of the pendulum with a screw; so that it may be at any time made longer or shorter, according as the bob is screwed downwards or upwards, and thereby the time of its vibrations kept always the same. Again, if a glass or metalline tube, uniform throughout, filled with quicksilver, and 58.8 inches long, were applied to a clock, it would vibrate seconds

(for $39.2 = \frac{2}{3}$ of 58.8) and such a pendulum admits of a twofold expansion and contraction, *viz.* one of the metal and the other of the mercury, and these will be at the same time contrary, and therefore will correct each other. For by what we have shewn, the metal will extend in length with heat, and so the pendulum will vibrate slower on that account. The mercury also will expand with heat, and since by this expansion it must extend the length of the column upward, and consequently raise the center of oscillation; so that by this means its distance from the point of suspension will be shortened, and therefore the pendulum on this account will vibrate quicker: wherefore, if the circumstances of the tube and mercury are skilfully adjusted, the time of the clock might, by this means, for a long course of time, continue the same, without any sensible gain or loss.

This is the invention of the late ingenious Mr. Graham, in the year 1721, who made a clock of this sort, and compared it with one of the best of the common sort for three years together, and found the errors of the former but about $\frac{1}{8}$ part of the latter; of which the reader may see a farther account in Phil. Transf, n^o 392. It is what is now called Mr. Graham's quicksilver-pendulum.

In the forty-seventh volume of the Philosophical Transactions, Mr. Short gives us an account of other inventions to remedy the same inconvenience. Mr. John Harrison, of Barrow, in Lincolnshire, famous for his invention of a clock to find the difference of longitude at sea, without having the least knowledge of what Mr. Graham had done before him, made several experiments upon wires of different metals, in order to find their different degrees of expansion and contraction. He thought that by a proper combination of wires of two different metals, differing considerably in their expansion and contraction, he might be enabled to keep the center of oscillation of a pendulum always at the same distance from the point of suspension. In consequence of these experiments, he made a pendulum consisting of one steel-wire, at the end of which is the bob or weight; and on each side of this wire, four wires alternately brass and steel, so disposed and contrived as to raise the pendulum by the same quantity that it is lengthened by heat, and to let down the pendu-

pendulum in the same proportion as it is raised by cold.

Mr. Harrison, in his first machine for measuring time at sea, likewise applied this combination of wires of brass and steel, to prevent any alterations by heat and cold. And in the other machines or clocks he has since made for the same purpose, a like method of guarding against the irregularities arising from this cause is used, as has been shown under the article LONGITUDE.

Mr. Graham also made a pendulum consisting of three bars, one of steel between two of brass, and the steel bar acted upon a lever, so as to raise the pendulum, when lengthened by heat, and to let it down, when shortened by cold; but he found this clock liable to sudden starts and jerks in its motion.

The ingenious Mr. Ellicott, in the same volume of the Transactions, describes a pendulum of his invention, composed of brass and iron, with the method of applying it, so as to avoid the many jerks to which the machine might be liable.

But besides the irregularities arising from heat and cold, pendulum-clocks are liable to others from friction and foulness; to obviate which, Mr. Harrison has several excellent contrivances, whereby his clocks are almost entirely free from friction, and never need to be cleaned. See FRICTION and LONGITUDE.

PENE, a river of upper-Saxony, in Germany, which separates the Swedish territories from those of Brandenburg.

PENEMÜNDER, a fortress of Germany, in the circle of upper-Saxony and duchy of Pomerania, situated on the isle of Usedom, at the mouth of the river Pene, in east long. $14^{\circ} 10'$, north lat. $54^{\circ} 20'$.

PENETRABILITY. See the article IMPENETRABILITY.

PENETRALE, in roman antiquity, properly denoted the chapel consecrated to the penates, or household-gods.

PENETRATION, *penetratio*, the act whereby one thing acts upon another, or takes up the place already possessed by another.

Chauvinus defines penetration the co-existence of two or more bodies, so as one is present, or has its extension in the same place as the other.

Philosophers hold the penetration of bodies absurd, *i. e.* that two bodies should be at the same time in the same place; and, accordingly, impenetrability is laid down as one of the essential properties of

matter. What is commonly therefore meant by penetration, only amounts to the matter of one body being admitted into the vacuities of another.

PENFORD, a market-town of Somersetshire, situated ten miles west of Bath.

PENGUIN ISLAND and BAY, are situated on the coast of Patagonia in South-America: west long. 70° , south lat. 47° .

PENGUIN, in ornithology, a name given to a species of the alca, with eight furrows on the beak, and a white spot before the eye. It is a very large and singular bird, equal to the common goose in size; the head is large and flattened on the crown; the eyes are pretty large, and their iris grey with a tinge of yellow; the beak is of a kind of triangular figure, compressed at the sides, and a little hooked just at the extremity: the wings and tail are short, the feet stand backward, and the toes are connected by a membrane. See the article ALCA.

PENICHE, a port-town of Portugal, in the province of Estremadura, situated on the Ocean, forty miles north of Lisbon: west long. $9^{\circ} 6'$, north lat. $39^{\circ} 20'$.

PENICK, a town of Germany, in the marquisate of Misnia, situated sixteen miles south-east of Altenburg.

PENICILLA, in pharmacy, a lozenge, or form of medicine, made round by rolling. See the article LOZENGE.

PENICILLUS, among surgeons, is used for a tent to be put into wounds or ulcers. See the article TENT.

PENIDIUM SACCHARUM, in pharmacy, is prepared thus: dissolve sugar as much as you please, clarify it with the white of an egg; then strain and inspissate it gently, or slowly, till great bubbles arise: this done take it off the fire till the bubbles subside, and then pour it out upon a board which has been rubbed over with oil of almonds; and when it is somewhat hardened, take it up with your hook, and with your hand sprinkled with starch, speedily reduce it into its proper form, and lay it up for use.

It is good against colds, to moderate the acrimonies of the breast, promote expectoration, &c.

PENINSULA, in geography, a portion or extent of land, joining to the continent by a narrow neck, or isthmus; the rest being encompassed with water.

PENIS, the YARD, in anatomy, the primary organ of generation in man; being called also mentula, virgo, priapus, and by a multitude of other names.

Anato.

Anatomists divide the penis into three parts, the body, the glans, and the urethra. In the body of the penis, are observable the cuticle and cutis, as the common integuments; the prepuce, being a reduplication of the cutis covering the glans; and in the lower part of this is fixed the frenulum, all which are described under their several heads. See the articles CUTICLE, CUTIS, PREPUCE, and FRÆNUM.

After these is observable the proper teguments or coats of the penis. This is a robust coat, of a membranous nature, surrounding every part of the penis. It is sometimes double, and has in the interstitial space a cellulose coat which is discoverable by inflation and drying in that state. Under this are the two bodies which constitute the penis; these, being called the corpora cavernosa, or spongiosa, are described under the article CAVERNOSE.

For a description of the other two parts of the penis, viz. the glans and urethra, see GLANS and URETHRA.

The penis is joined by synchondrosis to the ossa pubis, by means of a ligament called ligamentum Vesalii, as also by its lateral ligaments. The muscles of the penis are numerous: they serve principally for the erecting it. See MUSCLE. The vessels of the penis are very numerous, and are distributed through it in a very surprising and beautiful manner. To the consideration of the penis there yet also belong the glands, called from their discoverer glandulæ Cowperi mucosæ: he describes three of them, two of which are situated regularly one on each side of the urethra, between the muscoli acceleratores and the bulb: they are said to be of an oval figure, but somewhat compressed, and of the size of a horse-bean. They secrete a mucous pellucid liquor, which each discharges at its own duct into the urethra: the use of the fluid which they secrete seems to be that of lubricating the urethra, and defending it from being hurt by the acrimony of the urine. The third of them, which is single, is in the angle of the curvature of the urethra, under the os pubis, and within the corpus cavernosum: such are the glandulæ Cowperi. Finally, the glandula Littrii is situated just below the prostata, and lodged between the two membranes and coats of the urethra: the use of this gland is the same with those already described. The vessels of

the penis, urethra, and these glands, are in common: their arteries are from the hypogastrics, and those of the pudenda: the veins, which all have valves, carry back the blood to the veins of the same parts; but before they join them, they make various anastomoses, and form a wonderful kind of reticulation in the body of the penis. The nerves come from the last of those of the os sacrum, and the lymphatic vessels are numerous.

The uses of the penis are two, viz. a primary and a secondary: the primary use of it is to serve in the office of generation, and the secondary for the excretion of the urine.

For the disorders of the penis, see the articles GONORRHOEA, *with its symptoms* PHIMOSIS, PARAPHIMOSIS, &c.

PENISCOLA, a port-town of Spain, in the province of Valencia, situated on the Mediterranean, under the meridian of London, and in north lat. 40° 29'.

PENITENCE, *pœnitentia*, properly signifies the same with repentance; but is also used for the discipline, or punishment, more usually called penance. See the article PENANCE.

There are several orders of penitence, consisting either of converted debauchees, reformed prostitutes, or persons who devote themselves to the office of reforming them: such are the order and congregation of penitence of St. Magdalen, in France; the converts of the name of Jesus, at Seville; and the penitents of Orvietto.

PENITENTS, an appellation given to certain fraternities of penitents distinguished by the different shape and colour of their habits. These are secular societies, who have their rules, statutes, and churches, and make public processions under their particular crosses or banners. Of these there are more than a hundred, the most considerable of which are as follows: the white penitents, of which there are several different sorts at Rome, the most antient of which was constituted in 1264: the brethren of this fraternity every year give portions to a certain number of young girls, in order to their being married: their habit is a kind of white sackcloth, and on the shoulder is a circle, in the middle of which is a red and white cross. Black penitents, the most considerable of which are the brethren of mercy, instituted in 1488, by some Florentines, in order to assist criminals

minals during their imprisonment, and at the time of their death: on the day of execution, they walk in procession before them, singing the seven penitential psalms and the litanies; and after they are dead, they take them down from the gibbet and bury them: their habit is black sackcloth. There are others, whose business it is to bury such persons as are found dead in the streets: these wear a death's head on one side of their habit. There are also blue, grey, red, green, and violet penitents; all which are remarkable for little else besides the different colours of their habits.

Mabillon tells us, that at Turin there are a set of penitents kept in pay to walk through the streets in procession, and cut their shoulders with whips, &c.

PENITENTIAL, an ecclesiastical book retained among the romanists; in which is prescribed what relates to the imposition of penance, and the reconciliation of penitents. See the article **PENANCE**. There are various penitentials, as the roman penitential, that of the venerable Bede, that of pope Gregory III. &c.

PENITENTIARY, in the antient christian church, a name given to certain presbyters, or priests, appointed in every church to receive the private confessions of the people, in order to facilitate public discipline, by acquainting them what sins were to be expiated by public penance, and to appoint private penance for such private crimes as were not proper to be publicly censured.

PENITENTIARY, at the court of Rome, is an office in which are examined and delivered out the secret bulls, graces, or dispensations relating to cases of conscience, confessions, &c.

PENITENTIARY is also an officer, in some cathedrals, vested with power from the bishop to absolve, in cases reserved to him. The pope has at present his grand penitentiary, who is a cardinal, and the chief of the other penitentiary priests established in the church of Rome, who consult him in all difficult cases. He presides in the penitentiary, dispatches dispensations, absolutions, &c. and has under him a regent and twenty-four proctors, or advocates of the sacred penitentiary.

PENKRIDGE, a market-town, four miles south of Stafford.

PENMANMAUR, one of the highest mountains in Wales, in Carnarvonshire.

PENNAFLOR, a town of Spain, in Asturias, fifteen miles south-west of Orviedo.

PENNATED, or **PINNATED**, among botanists. See the article **PINNATED**.

PENNON, or **PENON**, a kind of standard, with a long tail, antiently belonging to a simple gentleman. It is opposed to the banner, which was square. See the article **BANNER**.

PENNY, an antient silver-coin, which, though now little used, was the only one current among our saxon ancestors. See the article **COIN**.

PENNY-EARTH, in agriculture, denotes a hard, loamy, or sandy earth, with a large proportion of sea-shells intermixed with it.

PENNY-POST. See the article **POST**.

PENNY-WEIGHT, a troy-weight, containing twenty-four grains, each of which is equal in weight to a grain of wheat, gathered out of the middle of the ear, and well dried. See **WEIGHT**.

PENON, or **PENNON**. See **PENNON**.

PENON DE VELEZ, a port-town of Barbary, situated on the Mediterranean, eighty miles south-east of the Streights of Gibraltar.

PENRISE, a port-town of Wales, in the county of Glamorgan, situated on Bristol-channel, seventeen miles south of Caermarthen.

PENRITH, a market-town of Cumberland, sixteen miles south of Carlisle.

PENRYN, a borough-town of Cornwall, near a bay of the English-channel: west long. $5^{\circ} 35'$, north lat. $50^{\circ} 20'$.

It sends two members to parliament.

PENSANCE, a market-town of Cornwall, eight miles east of the Land's end.

PENSILVANIA, one of the english plantations in America, two hundred miles in length, and almost as much in breadth: situated between 74 and 78° of west longitude, and between 39 and 42° of north latitude: a fine fruitful country, bounded by the five nations of the Iroquois on the north; by New-Jersey and New-York on the east; and by Maryland on the south and west. It is a proprietary government, the heirs of Mr. Penn, a quaker, who settled this country, appointing the governor.

PENSION, a sum of money paid annually for services or considerations already past. The yearly payment of each member to the houses of the inns of courts, are likewise termed pensions; and the yearly assembly

sembly of the members of the society of Gray's Inn, to consult on the affairs of the house, is also called a pension.

PENSIONARY, or **PENSIONER**, a person who has an appointment, or yearly sum, payable during life, by way of acknowledgment, charged on the estate of a prince, company, or particular person. See the article **ANNUITY**.

Grand PENSIONARY, an appellation given to the first minister of the States of Holland. The grand pensionary is chairman in the assemblies of the states of that province; he proposes the matters to be consulted on; collects the votes; forms and pronounces the resolutions of the states; opens letters; confers with foreign ministers, &c. His business is also to inspect the finances, to maintain the authority of the states, and to see that the laws are observed; and he is perpetual deputy of the states-general of the United-Provinces. His commission is however given him only for five years; after which it is deliberated whether or no it shall be renewed; but there is no instance of its being revoked: therefore death only puts an end to the functions of this important minister.

PENSIONARY, is also the first minister of the regency of each city in Holland. His office is to give his advice in affairs relating to the government either of the state in general, or of the city in particular; and in assemblies of the states of the province, he is speaker in behalf of his city. The function, however, of these pensionaries is not every where alike: in some cities they only give their advice, and are never found in assemblies of the magistrates, except when expressly called thither: in others they attend constantly; and in others they make the propositions on the part of the burgo-masters, draw up their conclusions, &c. They are called pensionaries, because they receive an appointment or pension.

PENSIONER, in general, denotes a person who receives a pension, yearly salary, or allowance. Hence,

The band of gentlemen-pensioners, the noblest sort of guard to the king's person, consists of forty gentlemen, who receive a yearly pension of one hundred pounds. This honourable band was first instituted by king Henry VIII. and their office is to attend the king's person, with their battle-axes, to and from his chapel-royal, and to receive him in the presence chamber, or coming out of his privy-lodgings:

they are also to attend at all great solemnities, as coronations, St. George's feast, public audiences of ambassadors, at the sovereign's going to parliament, &c.

They are each obliged to keep three double horses and a servant, and so are properly a troop of horse. They wait half at a time, quarterly; but on Christmas-day, Easter-day, Whitsunday, &c. and on extraordinary occasions, they are all obliged to give their attendance. They have likewise the honour to carry up the sovereign's dinner on the coronation-day, and St. George's feast; at which times, the king or queen usually confer the honour of knighthood on two such gentlemen of the band as their captain presents.

Their arms are gilt battle-axes; and their weapons, on horse-back, in time of war, are curassiers-arms, with sword and pistols. Their standard, in time of war, is, argent, a cross gules. Their captain is always a nobleman, who has under him a lieutenant, a standard-bearer, a clerk of the check, secretary, paymaster, and harbinger.

PENSTOCK, a sluice, or flood-gate, serving to retain or let go, at pleasure, the water of a mill-pond, or the like. See the article **SLUICE**.

PENTACHORD, an antient musical instrument, with five strings, whence the name.

The strings were of bullocks-leather, and struck with a plectrum made of goats-horn.

PENTACROSTIC, in poetry, a set of verses so disposed as that there are always five acrostics of the same name, in five divisions of each verse. See **ACROSTIC**.

PENTAEDROSTYLA, in natural history, the name of a genus of spars. See the article **SPAR**.

The bodies of this genus are spars, in form of pentangular columns, terminated by pentangular pyramids at one end, and irregularly affixed at the other to some solid body.

Of this genus there are three known species. 1. One with a very long pyramid. This is found in the mines on Mendip-hills. 2. One with a thick column, and a very short and large pyramid. This is found in the Hartz-forest in Germany, and in Cumberland. And, 3. One with a broad depressed pyramid. This is found, so far as it is yet known, only in the mines at Rammelsberg in the Hartz forest in Germany.

PEN-

PENTAGON, in geometry, a figure of five sides and five angles.

If the five sides be equal, the angles are so too, and the figure called a regular pentagon: such is *A B C D E* (plate CXCVI. fig. 4.) inscribed in the circle.

The most considerable property of a pentagon is, that one of its sides, *D E*, is equal in power to the sides of a hexagon and a decagon, inscribed in the same circle *A B C D E*; that is, the square of the side *D E*, is equal to the sum of the squares of the sides *d E* and *E b*.

The area of a pentagon, like that of any other polygon, may be obtained by resolving it into triangles. See the articles **TRIANGLE** and **POLYGON**.

Pappus has also demonstrated, that twelve regular pentagons contain more than twenty triangles inscribed in the same circle, lib. v. probl. 45.

The dodecahedron, which is the fourth regular solid, consists of twelve pentagons.

In fortification, pentagon denotes a fort with five bastions.

PENTAGRAPH, or **PARALLELOGRAM**, an instrument whereby designs of any kind may be copied in what proportion you please, without being skilled in drawing.

It consists of four brass or wooden rulers, (plate CXCVI. fig. 5.) two of them from fifteen to eighteen inches long; the other two half that length. At the ends and middle of the long rulers, as also at the ends of the shorter, are holes, upon the exact fixing whereof, the perfection of the instrument chiefly depends. Those in the middle of the long rulers are to be at the same distance from those at the ends of the long ones, and those of the short ones, so as to form a parallelogram.

It is fitted together by a large pillar *a*, having at one end a screw and nut, whereby the two long rulers are joined, and at the other a little knot for the instrument to slide on: *b* is a rivet with a screw and nut, wherewith each short ruler is fastened to the middle of each long one: *c* is a pillar, one end whereof, being hollowed into a screw, has a nut fitted to it; at the other end is a worm to screw into the table; when the instrument is to be used, it joins the ends of the two short rulers: *d* is a pen or pencil screwed into a little pillar: *e* is a brass-point, moderately blunt, screwed, likewise, into a little pillar.

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Use of the PENTAGRAPH. 1. To copy a design in the same scale as the original: screw the worm *c* into the table; lay a paper under the pencil *d*, now placed at *f*, and the design under the point *e*, now placed at *g*; then, conducting the point over the several lines of the design, the pencil *f* will draw the same on the paper. 2. If the design be to be reduced into half, &c. the space, the worm must be placed at the end of the long ruler *d*, and the paper and pencil on the middle. In this situation conduct the brass-point as before, and the pencil will draw its copy in the proportion required, the pencil here moving half the length that the point does.

On the contrary, if the design be to be enlarged by one half, the brass point, with the design, must be placed in the middle at *c*, the pencil and paper at the end of the long ruler, and the worm at the other.

3. To enlarge or reduce in other proportions, there are holes drilled at equal distances on each ruler, namely, all along the short ones, and half way the long ones, in order for placing of the brass-point, pencil, and worm, in a right-line therein; that is, if the piece carrying the point be put in the third hole, the two other pieces must be put in its third hole.

If then the point and design be placed at any hole of the great ruler, and the pencil with the paper at any hole of the short ruler, which forms the angle therewith, the copy will be less than half the original. On the contrary, if it be placed at one of the holes of that short ruler, which is parallel to the long ruler, the copy will be greater than half the original.

Few of these instruments will do any thing tolerably but straight lines, and many of them not those.

PENTAMETER, in antient poetry, a kind of verse consisting of five feet, or metres; whence the name.

The two first feet may be either dactyls or spondees, at pleasure; the third is always a spondee, and the two last anapests: such is the following verse of Ovid.

1 2 3 4 5
Carmini|bus vi|ves tem|pus in o|mne meis.
A pentameter verse, subjoined to an hexameter, constitutes what is called elegiac. See the article **ELEGIAC**.

PENTANDRIA, in botany, one of Linnaeus's

næus's classes of plants, the fifth in order; the characters of which are, that all the plants comprehended in it have hermaphrodite flowers, with five stamina or male parts in each: they are subdivided into orders, which are denominated monogynia, digynia, trigynia, &c. according as there are one, two, three, &c. pistils, or female parts, in each flower. See the article STAMINA.

To this genus belongs the vine, of the order of the monogynia; the elm, of the digynia; sumach, of the trigynia, &c.

PENTAPETALOUS, an appellation given to flowers that consist of five petals or leaves. See the article FLOWER.

PENTAPETES, in botany, a genus of the monadelphia-polyandria class of plants, the calyx of which is simple; the stamina are at least twenty in number, five of which are very long and sterile, and the fruit is a capsule, containing five cells, with membranaceous seeds.

PENTAPOLIS, in geography, denotes a country wherein are only five cities: such was the pentapolis of Egypt, or Cyrenaica, which contained the five cities Berenice, Arsinoë, Ptolemais, Cyrene, and Apollonia.

PENTAPTOTON, in grammar, denotes a noun which has only five cases.

PENTASTICH, *πενταστιχον*, in poetry, a stanza, or division of a poem, consisting of five verses; whence the name.

PENTASTYLE, in architecture, a building wherein there are five rows of columns. See the article COLUMN.

PENTATEUCH, *πεντατευχος*, an appellation given to the first five books of the Old Testament, viz. Genesis, Exodus, Leviticus, Numbers, and Deuteronomy. See the article GENESIS, &c.

The Samaritans acknowledge no other scriptures besides the Pentateuch, which they still preserve in the old hebrew or phœnician character, as also in the vulgar samaritan.

PENTATHLON, in antiquity, a general name for the five exercises performed at the grecian games, viz. wrestling, boxing, leaping, running, and playing at the discus. See the articles GAMES, WRESTLING, &c.

PENTATONON, in the antient music, a concord called by us the redundant sixth. See the article SIXTH.

PENTECOST, a solemn festival of the Jews, so called because it was celebrated on the fiftieth day after the sixteenth of the month Nisan, which was the second

day of the passover. See PASSOVER.

The feast of pentecost was instituted in memory of the law's being given, on the fiftieth day after the Israelites came out of Egypt.

It was on the feast of pentecost that the Holy Ghost miraculously descended on the apostles. See WHITSUNDAY.

PENTELASMIS, in the history of shellfish, a genus of animals, composed of a fleshy body, affixed to a fleshy and soft pedicle; the body is composed of five valves, and the pedicle is sometimes short, and in other species considerably long. The animal, inhabiting the shell-body of this genus, is a triton. See the article TRITON.

This genus comprehends the goose-shell, or barnacle, being a tender, brittle shell, about an inch long, and three quarters of an inch in diameter. See the article CONCHA ANATIFERA.

PENTHEMIMERIS, in antient poetry, a part of a verse consisting of two feet and a long syllable.

PENTHORUM, in botany, a genus of the decandria pentagynia class of plants, without any flower-petals; the fruit is a single capsule, divided into five parts, with five conic angles, and containing five cells, with numerous seeds in each.

PENULTIMA, or **PENULTIMATE SYLLABLE**, in grammar, denotes the last syllable but one of a word; and hence the anti-penultimate syllable is the last but two, or that immediately before the penultima.

PENULTIMATE CHORD, in music, according to Brossard, is the same with what the Greeks call paranete, though others will have the paranete to be only the next chord to the ultimate.

PENULTIMATE of the separate, paranete diazeugmenon, a name the antients gave to one of the chords of their lyre or system, corresponding to the *de, la, re* of the third octave of the modern system.

PENULTIMATE of the acute, paranete hyperbolæon, a chord of the antient system, answering to the *ge, re, sol* of the third octave of the modern system.

PENUMBRA, in astronomy, a partial shade observed between the perfect shadow and the full light in an eclipse.

It arises from the magnitude of the sun's body; for were he only a luminous point, the shadow would be all perfect; but by reason of the diameter of the sun, it happens that a place which is not illuminated by the whole body of the sun, does yet receive

receive rays from a part thereof. See the article ECLIPSE.

PEPASMUS, in medicine, denotes the digesting and concocting of morbid humours.

PEPASTIC, or PEPTIC, in physic, are medicaments of the consistence of an emplaister, for bringing humours to a head, and disposing them to maturation.

PEPLIS, WATER-PURLAIN, in botany, a genus of the hexandria-digynia class of plants, the flower of which consists of five very small oval petals; and its fruit is a cordated bilocular capsule, containing numerous very small and triquetrous seeds.

PEPO, the POMPION, in botany, is comprehended by Linnæus among the cucurbita. See the article CUCURBITA.

PEPPER, *piper*, in natural history, an aromatic berry, of a hot dry quality, chiefly used in seasoning.

We have three kinds of pepper at this time in use in the shops; the black, the white, and the long pepper.

Black pepper is the fruit of a plant of the diandria-trigynia class, without any flower-petals: the fruit itself is roundish and rugose, and disposed in clusters: it is brought from the dutch settlements in the East-Indies. See plate CC. fig. 3.

The common white pepper is factitious, being prepared from the black in the following manner: they steep this in seawater, exposed to the heat of the sun for several days, till the rind or outer bark loosens; they then take it out, and when it is half dry, rub it till the rind falls off; then they dry the white fruit, and the remains of the rind blow away like chaff. A great deal of the heat of the pepper is taken off by this process; so that the white kind is fitter for many purposes than the black. However, there is a sort of native white pepper, produced on a species of the same plant, which is much better than the factitious, and indeed little inferior to the black.

The long pepper is a dried fruit of an inch or an inch and an half in length, and about the thickness of a large goose-quill: it is of a brownish-grey colour, cylindrical in figure, and said to be produced on a plant of the same genus.

Pepper is principally used by us in food, to assist digestion; but the people in the East Indies esteem it as a stomachic, and drink a strong infusion of it in water by way of giving them an appetite: they have also a way of making a fiery spirit

of fermented fresh pepper with water, which they use for the same purposes. They have also a way of preserving the common and long pepper in vinegar, and eating them afterwards at meals.

Common pepper pays a duty, on importation, of 2 s. 4 $\frac{1}{2}$ d. per pound; but if imported immediately from the place of growth in british shipping, it pays only $\frac{47\frac{1}{2}}{100}$ d. per pound. Long pepper pays, on importation, $2\frac{32\frac{1}{2}}{100}$ d. the pound; and

draws back, on exportation, $2\frac{4}{100}$ d.

Chiapa-PEPPER, is thought to be the same with Jamaica-pepper.

Jamaica PEPPER, *pimenta*, in botany. See the article PIMENTA.

Indian PEPPER, or *Guinea*-PEPPER, *capsicum*, in botany. See CAPSICUM.

Poor man's PEPPER, or PEPPER WORT, a name given to lepidium. See LEPIDIUM.

Water-PEPPER, is only a species of sedum, or house leek.

PEPPER-BIRD, the english name of a species of ramphastos, with a yellow rump. See the article RAMPHASTOS.

All the species of ramphastos are fond of pepper, but this eats it the most voraciously of them all; whence its english name: it is about the size of our jackdaw; and its beak is six inches, or more, in length, and three inches in diameter at the base.

PEPPER-EEL, in the history of animalcules, a species of enchelis, found in pepper-water and other vegetable infusions. See the articles ENCHELIS and PEPPER-WATER.

PEPPER-MINT, a species of mint. See the article MINT.

PEPPER-WATER, a liquor prepared in the following manner, for microscopical observations: put common black pepper, grossly powdered, into an open vessel so as to cover the bottom of it half an inch thick, and put to it rain or river water, till it covers it an inch; shake or stir the whole well together at the first mixing, but never disturb it afterwards: let the vessel be exposed to the air uncovered; and in a few days there will be seen a pellicle or thin skin swimming on the surface of the liquor, looking of several colours.

This is a congeries of multitudes of small animals; and being examined by the microscope, will be seen all in motion: the animals, at first sight, are so small as not to be distinguishable, unless

to the greatest magnifiers; but they grow daily till they arrive at their full size. Their numbers are also continually increasing, till the whole surface of the liquor is full of them, to a considerable depth. When disturbed they will sometimes all dart down to the bottom, but they soon after come up to the surface again. The skin appears soonest in warm weather, and the animals grow the quickest; but in the severest cold it will succeed, unless the water freezes.

About the quantity of a pin's head of this scum, taken up on the nib of a new pen, or the tip of a hair-pencil, is to be laid on a plate of clear glass; and if applied first to the third magnifier, then to the second, and, finally, to the first, will shew the different animalcules it contains, of several kinds and shapes as well as sizes.

PEPSIS, among physicians, denotes the concoction of food or humours in the body. See the article **CONCOCTION**.

PEPUS, or **PEIBUS**, a lake situated on the confines of Livonia, has a communication with the gulph of Finland; and the lake Werfero in the dominions of Russia.

PEQUIGNY, a town of Picardy, in France, fifteen miles south of Abbeville.

PERA, one of the suburbs of Constantinople, where ambassadors and christians usually reside.

PERAMBULATION, in law, signifies the walking about a forest, parish, or the like, by justices or others, in order to mark down and preserve the limits and bounds thereof.

PERAMBULATIONE FACIENDA, a writ commanding the sheriff to make perambulation, in order to settle the bounds of two adjoining manors.

This writ is only issued, where the two lords of the manors agree to such perambulation; for if either of them refuse, the other shall have the writ de rationabilibus divisis. See **RATIONABILIBUS**.

PERAMBULATOR, in surveying, an instrument for measuring distances, called also pedometer, way-wiser, and surveying wheel.

It consists of a wheel *AA* (pl. **CXCVII**. fig. 1. n° 1.) two feet seven inches and a half in diameter; consequently, half a pole, or eight feet three inches in circumference. On one end of the axis is a nut, three quarters of an inch in diameter, and divided into eight teeth; which, upon moving the wheel round, fall into the eight teeth of another nut *c* (*ibid.* n° 2.) fixed on one end of an iron-

rod *Q*, and thus turn the rod once round, in the time the wheel makes one revolution. This rod, lying along a groove in the side of the carriage of the instrument, under the dotted line, has at its other end a square hole, into which is fitted the end *b* of a small cylinder *P*. This cylinder is disposed (*ibid.* n° 3.) under the dial-plate of a movement, at the end of the carriage *B*, in such a manner as to be moveable about its axis: its end *a* is cut into a perpetual screw, which falling into the thirty-two teeth of a wheel perpendicular thereto, upon driving the instrument forward, that wheel makes a revolution each sixteenth pole. On the axis of this wheel is a pinion with six teeth, which, falling into the teeth of another wheel of sixty teeth, carries it round every hundred and sixtieth pole, or half a mile.

This last wheel, carrying a hand or index round with it over the divisions of a dial-plate, whose outer limb is divided into one hundred and sixty parts, corresponding to the one hundred and sixty poles, points out the number of poles passed over. Again, on the axis of this last wheel is a pinion, containing twenty teeth, which, falling into the teeth of a third wheel, which hath forty teeth, drives it once round in three hundred and twenty poles, or a mile. On the axis of this wheel is a pinion of twelve teeth, which, falling into the teeth of a fourth wheel, having seventy-two teeth, drives it once round in twelve miles.

This fourth wheel, carrying another index over the inner limb of the dial-plate, divided into twelve for miles, and each mile subdivided into halves, quarters, and furlongs, serves to register the revolutions of the other hand, and to keep account of the half miles and miles passed over as far as twelve miles.

The use of this instrument is obvious from its construction. Its proper office is in the surveying of roads and large distances, where a great deal of expedition, and not much accuracy, is required. It is evident, that driving it along, and observing the hands, has the same effect as dragging the chain, and taking account of the chains and links. Its advantages are its handiness and expedition; its contrivance is such, that it may be fitted to the wheel of a coach, in which state it performs its office, and measures the road without any trouble at all.

Fig. 1. PERAMBULATOR

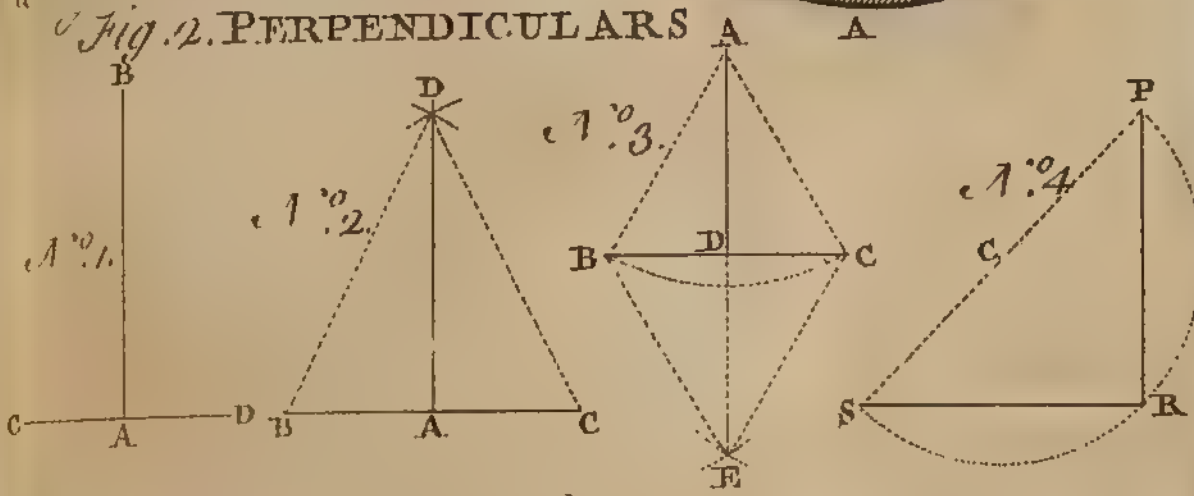
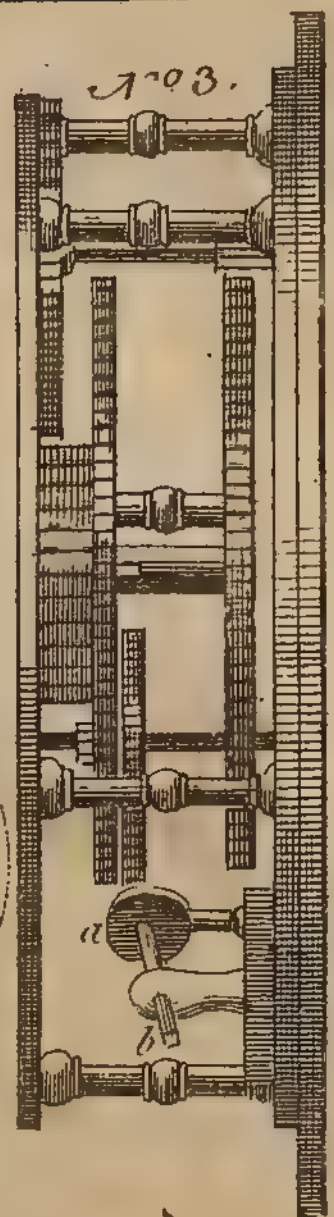
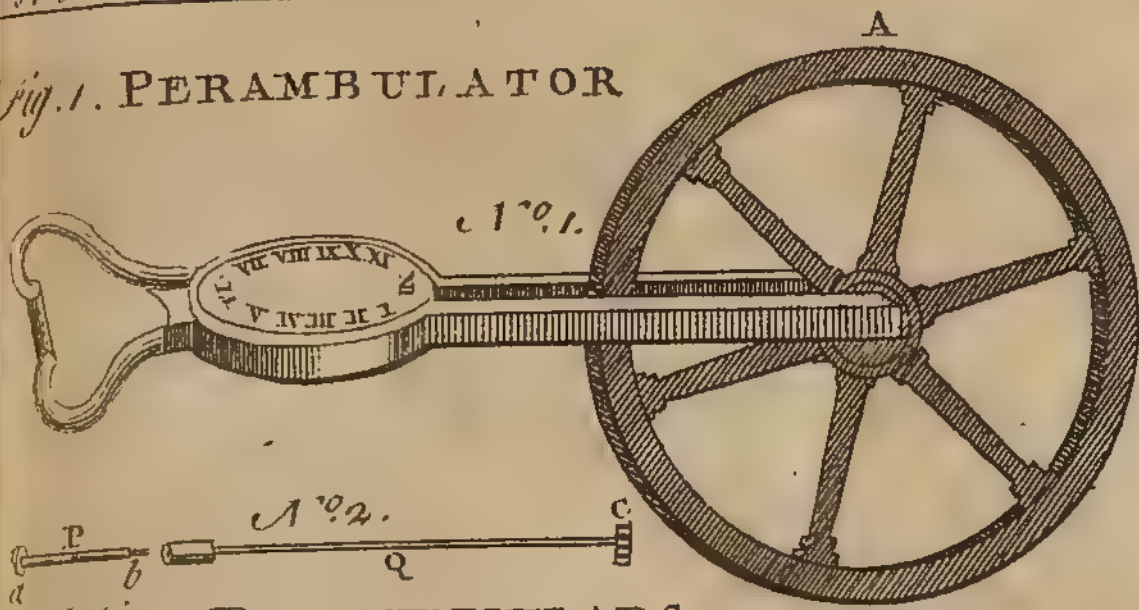


Fig. 3. PINNATED LEAVES.

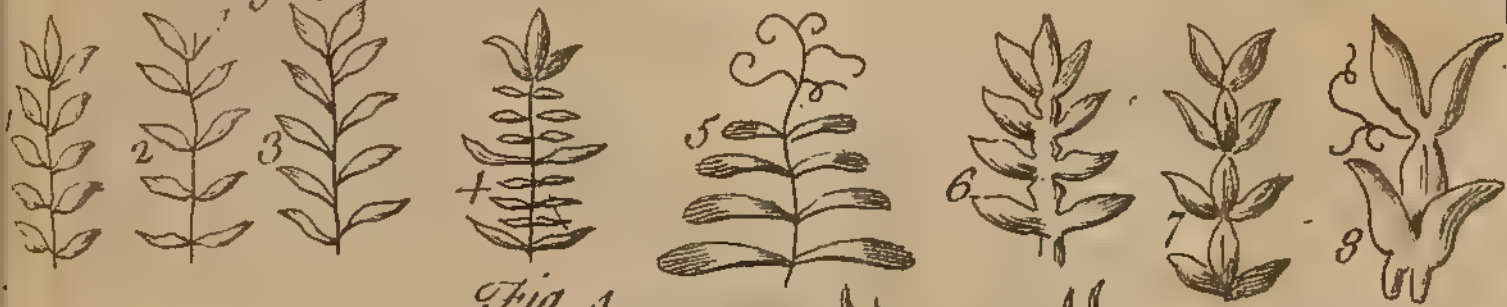
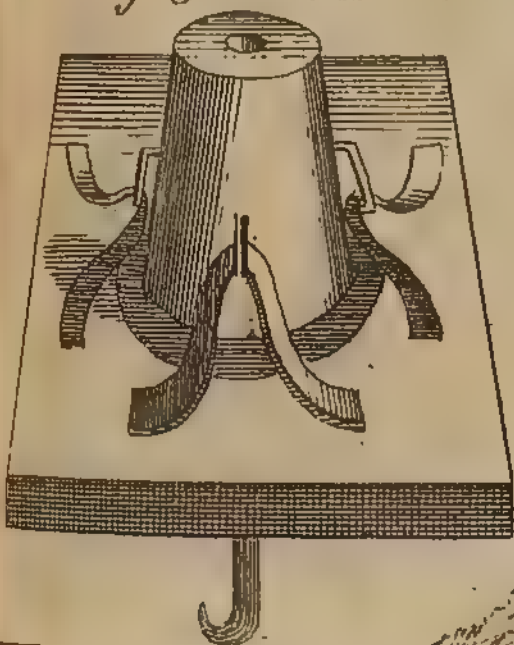


Fig. 4. The Horned Indian PHEASANT

Fig. 6. PILE



Fig. 5. PETARD.



J. G. Jones sculp

PER ARSIN ET THESIN, in music. *Per arsin*, in a song, counterpoint, figure, &c. is when the notes ascend from grave to acute; and *per thesin*, when they descend from acute to grave.

PERCA, the **PEARCH**, in ichthyology, a genus of the acanthopterygious order of fishes, the characters of which are, that the branchiostege membrane on each side contains seven bones, and the back has one or two fins.

Besides the common *pearch*, this genus comprehends the *lucius* and *lucio-perca*. See **LUCIUS** and **LUCIOPERCA**.

The *pearch* is distinguished by several transverse streaks, and by having the belly-fins red: it grows in some places to a foot and an half in length, and is considerably thick in proportion; but its more usual size is eight or nine inches in length: its nostrils are large and patulous, and nearer the eyes than the extremity of the snout.

PERCASLAW, or **PEREJESLAW**, a city of the Ukrain, in Russia, forty-four miles south-east of Kiof.

PERCEPTION, in logic, the first and most simple act of the mind, whereby it perceives or is conscious of its ideas. See the article **IDEA**.

In bare perception, the mind is for the most part only passive; yet impressions made on the senses cause no perception, unless they are taken notice of by the mind, as we see in those who are intently busied in the contemplation of certain objects. It ought also to be observed, that the ideas we receive by perception are often altered by the judgment, without our taking notice of it; so that we take that for the perception of our senses, which is but an idea formed by the judgment: thus, a man who reads, or hears, with attention, takes little notice of the characters or sounds, but of the ideas excited in him by them. See the article **JUDGMENT**.

The faculty of perception seems to be that which constitutes the distinction between the animal kingdom and the inferior parts of nature. Perception is also the first step towards knowledge, and the inlet of all the materials of it; so that the fewer senses a man has, and the duller the impressions that are made by them are, the more remote he is from that knowledge which is to be found in other men. See **KNOWLEDGE**.

PERCH, or **PEARCH**, *perca*. See **PERCA**.

PERCH, a measure of length. See the article **MEASURE**.

PERCHANT, among fowlers, denotes a decoy-bird, which being fastened by the foot, flutters about the place to draw other birds to it.

PERCHE, a territory of Orleanois, bounded by Normandy on the north.

PERCOLATION, the same with filtration. See the article **FILTRATION**.

PERCUSSION, in mechanics, the impression a body makes in falling or striking upon another, or the shock of two bodies in motion. See the article **MOTION**.

Percussion is either direct or oblique; direct, when the impulse is given in a line perpendicular to the point of contact; and oblique, when it is given in a line oblique to the point of contact. See the article **CENTER**.

The ratio which an oblique stroke bears to a perpendicular one, is as the sine of the angle of incidence to the radius. Thus, let *ab* (plate CXCVI. fig. 6.) be the side of any body on which an oblique force falls, with the direction *da*; draw *dc* at right angles to *db*, a perpendicular let fall from *d* to the body to be moved, and make *ad* the radius of a circle; it is plain that the oblique force *da*, by the laws of composition and resolution of motions, will be resolved into the two forces *dc* and *bd*; of which *dc*, being parallel to *ab*, hath no energy or force to move that body; and, consequently, *db* expresses all the power of the stroke or impulse on the body to be moved: but *db* is the right sine of the angle of incidence *dab*; wherefore the oblique force *da*, to one falling perpendicularly, is as the sine of the angle of incidence to the radius.

PER DELIQUIMUM. See **DELIQUIMUM**.

PERDIX, the partridge. See the article **PARTRIDGE**.

PERDUES, or **ENFANS PERDUES**. See the article **FORELORN HOPE**.

PEREGRINE, among astrologers, a term applied to a planet, when found in a sign where it has none of its five essential dignities.

PEREMPTORY, in law, where joined to a substantive, denotes a final and determinate act, without any hope of renewing or altering the same; thus we find *peremptory day*, *action*, *mandamus*, &c. in our law-books. But yet there may be what is called a putting off a *peremptory*, when the matter cannot be spoken

spoken to at the day fixed, on account of other business; and this is done by motion of the party, that the court will give a farther day without prejudice to him.

PERENNIAL, in botany, is applied to those plants whose roots will abide many years, whether they retain their leaves in winter or not: those which retain their leaves are called ever greens; but such as cast their leaves, are called deciduous, or perdifols. Some of these have annual stalks, which die to the root every autumn, and shoot up again in the spring; to which Jungius gives the title of *radix restibilis*.

PERENNIAL WINDS. See **WIND**.

PERETERION, a name which chirurgi- cal writers give to the perforating part of the trepan. See the article **TREPAN**.

PERFECT, something to which nothing is wanting; or that has all the requi- sites of its nature and kind.

PERFECT, in arithmetic. Perfect number is that, all whose aliquot parts added to- gether, make the same number with the number whereof they are such parts.

PERFECT PRETERIT TENSE, in gram- mar. See the article **PRETERIT**.

PERFECT, in music, denotes something that fills and satisfies the mind and the ear: in which sense we say, perfect cadence, per- fect concord, &c.

The antients had two kinds of concords, the major and minor, and each of these again was either perfect or imperfect. The word perfect, when joined to the words mode and time, usually expresses triple time, or measure; in opposition to double time, which they called im- perfect. See the article **TIME**.

PERFECTION, the state or quality of a thing perfect. See the last article.

Perfection is divided, according to Chau- vinus, into physical, moral, and meta- physical. Physical or natural perfection, is that whereby a thing has all its pow- ers or faculties, and those too in full vi- gour; and all its parts both principal and secondary, and those in their due proportion, constitution, &c. in which sense man is said to be perfect, when he has a sound mind in a sound body. This perfection is by the schools fre- quently termed *επερυντικη*, because a thing is enabled thereby to perform all its ope- rations.

Moral perfection is an eminent degree of virtue or moral goodness, to which men arrive by repeated acts of piety, be-

neficence, &c. This is usually subdivi- ded into absolute or inherent, which is actually in him to whom we attribute it; in imputative, which exists in some other, and not in him it is attributed to. Metaphysical, transcendental, or essential perfection, is the possession of all the es- sential attributes, or of all the parts ne- cessary to the integrity of a substance; or it is that whereby a thing has or is provided of every thing belonging to its nature. This is either absolute, where all imperfection is excluded, such is the perfection of God; or *secundum quid*, and in its kind.

PERFIDIA, in music, a term borrowed from the Italians, signifying an affection of doing always the same thing, of pursuing the same design, continuing the same motion, the same song, the same passage, and the same figures of notes. Such are the stiff or constrained basses, as those of chacones, because depending wholly on the caprice of the composer.

PERFORANS MANUS, in anatomy, a muscle of the fingers, being the flexor of the third phalanx, called also profundus; which, arising at the upper part of the middle of the ulna, and dividing into four tendons, perforates the tendons of the perforatus manus, and is inserted into the beginning of the third phalanx of the four fingers. See the article **PERFORATUS**, &c.

PERFORANS PEDIS, in anatomy, a muscle of the toes, being the flexor of the third phalanx: its origin is from the hinder surface of the upper part of the tibia: towards the middle it is divided into four tendons, and these perforate the tendons of the perforatus pedis, and are after- wards terminated in the third phalanx.

PERFORATUS MANUS, in anatomy, a muscle of the fingers, called also subli- mis, being the flexor of the second pha- lanx, arising from the internal condyle of the humerus, and the radius: it is divided into four tendons, which are in- serted into the second phalanges of the four fingers. See **FLEXOR**, &c.

PERFORATUS PEDIS, in anatomy, a mus- cle of the toes, being the flexor of the se- cond phalanx, arising from the lower and inner surface of the calcaneum. It is di- vided into four tendons, which are per- forated and is terminated in the bones of the second phalanx.

PERFUME, *suffitus*, an agreeable artificial odour, affecting the organ of smelling. The generality of perfumes are made up of

of musk, ambergrise, civet, rose and cedar-woods, orange-flowers, jalsmin, jonquils, tuberoses, and other odoriferous flowers: those drugs commonly called aromatics, such as storax, frankincense, benzoin, cloves, mace, &c. enter the composition of a perfume: some are also composed of aromatic herbs or leaves, as lavender, marjoram, sage, thyme, hyssop, &c.

Perfumes were antiently very much in use: but since people are become sensible of the harm they do to the head, they are generally disused among us; however they are still common in Spain and Italy.

PERFUMES, in pharmacy, are topical or external remedies, composed of certain powders and gums, which being mixed together, and thrown on the coals, produce a vapour and smoke of great use in several diseases. There are dry perfumes made up in troches, pills, &c. of olibanum, mastic, olives, &c. and moist viscuous ones mixed with the juices of herbs.

By means of an oil distilled from tartar, Boerhaave observes, that rich perfumes may not only be exalted, but that musk and civet may have their scent invigorated after being decayed, by suspending them in a jakes.

PERGA, a port-town of european Turkey, in the province of Albina, opposite to the island of Corfu, in east long. 21°, north lat. 39° 20'.

PERGAMUS, an antient city of the lesser Asia, in the province of Phrygia, situated north of Smyrna.

PERIAGOGE, or **PERIBOLE**, in rhetoric, is used where many things are accumulated into one period which might have been divided into several.

PERIANTHIUM, in botany, expresses that sort of cup of a flower which either consists of several leaves, or else of one leaf divided into several segments, and surrounds the lower part of the flower. See the article **CALYX**.

PERIAPTON, περιπτον, a kind of medicine otherwise called periamma, or amulet, which being tied about the neck, is supposed to prevent or cure diseases. See the article **AMULET**.

PERICARDIUM, in anatomy, a membranaceous bag, loosely including the heart, and situated in the middle and lower part of the thorax, between the two lobes of the lungs. See **HEART**.

The figure of the pericardium is conic, like that of the heart itself. Its size is

such as can conveniently contain the heart without pressing upon it. It is connected with the mediastinum, with a great part of the diaphragm, and with the large vessels of the heart, which, together with this covering, sustain also the heart itself in its place. In beasts of most kinds, the heart is not at all connected with the diaphragm by its pericardium.

The pericardium is composed of a double membrane; the exterior one is common with the pleura and mediastinum; the interior one is proper, lubricous, and is continuous with the coats of the larger vessels. This membrane, when expanded upon the finger, frequently discovers a great number of foraminula or little apertures. The arteries and veins of the pericardium are from those of the mediastinum and diaphragm, and its nerves are also from the diaphragmatics. Its lymphatics all run to the thoracic duct.

The uses of the pericardium are, 1. To support the heart in a pendulous state, especially when we lie down. 2. To defend the heart from the cold air taken in at the lungs. 3. To preserve it from being injured by water, by matter, or any other extraneous fluid in the cavity of the thorax. And, 4. To contain the liquor of the pericardium, as it is called, which serves to facilitate the motions of the heart.

The liquor of the pericardium is a fluid resembling in appearance water in which raw flesh had been washed. The anatomical writers in general deduce this fluid from certain glands situated either in the pericardium, or in the heart itself; but as these glands are not to be found, Heister thinks it more rational to suppose that it is expressed out of the auricles of the heart in its systole. The pericardium is found sometimes in long hectics to cohere with the substance of the heart; and there are accounts of its having been wholly wanting.

PERICARPIA, in pharmacy, the same with epicarpia. See **EPICARPIUM**.

PERICARPIUM, among botanists, a covering or case for the seeds of plants. It is the germen of the pistil enlarged: there are no less than nine species of pericarpia: 1. A capsule. 2. A conceptaculum. 3. A pod. 4. A legumen. 5. A nut. 6. A drupe. 7. An apple. 8. A berry. 9. A strobilus. See **CAPSULE**, &c.

PERICHORUS, in antiquity, a name given by the Greeks to their profane games and combats, that is, to such as were

were not consecrated to any of the Gods. See the article GAMES.

PERICRANIUM, in anatomy, a thick solid coat, or membrane, covering the outside of the cranium or skull. See the article SKULL.

Some call it by the general name of periosteum, because of its adhering to the bone: others divide it into two membranes, the under one whereof immediately investing the skull they call periosteum, and the upper pericranium. In effect it is one double membrane, consisting, as most others do, of two coats. It is supposed to have its origin from the dura mater, which passing through the sutures of the skull, by means of several filaments, forms this thick membrane; at least it is found connected to the dura mater, by fibres transmitted from it to the membrane thro' the sutures. About the origin of the temporal muscles, the coats of the pericranium part; the outer passing over those muscles, and the inner still adhering close to the cranium. See the article PERIOSTEUM.

PERIDROME, *peridromus*, in antient architecture, the space, gallery, alley, or the like, in a periptere, between the columns and the wall.

PERIGEE, *perigæum*, in astronomy, that point of the sun's or moon's orbit, wherein they are at their least distance from the earth, in which sense it stands opposed to apogee. See the article APOGEE.

In the antient astronomy, perigee denotes that point in a planet's orbit, wherein the center of its epicycle is at the least distance from the earth. See the article PTOLEMAIC SYSTEM.

PERIGRAPHE, a word usually understood to express a careless or inaccurate delineation of any thing; but in Vesalius it is used to express the white lines or impressions that appear in the musculus rectus of the abdomen.

PERIGUEUX, a city of France, in the province of Guienne, capital of the territory of Perigord; situated on the river Lisle, in east long. 25', north lat. 45° 15'.

PERIHELUM, in astronomy, that point of a planet's or comet's orbit, wherein it is in its least distance from the sun; in which sense it stands in opposition to aphelium. See the article APHELUM.

The antient astronomers, on account of their supposing the earth in the center of the system, instead of this term used that of perigæum. See the article PERIGEE.

PERIMETER, in geometry, the bounds or limits of any figure or body. See the article FIGURE.

The perimeter of surfaces or figures are lines, those of bodies are surfaces. In circular figures, instead of perimeter, we say circumference, or periphery. See the article CIRCUMFERENCE.

PERINÆUM, or **PERINEUM**, in anatomy, the space between the anus and the parts of generation, divided into two equal lateral divisions, by a very distinct line, which is longer in males than in females. The perinæum is subject to laceration in a difficult birth. In this part an operation is performed, called a puncture of the perinæum, or perforation made into the urethra and bladder, to discharge the urine when it is suppressed. See the articles DELIVERY, ISCHURY, PARACENTESIS, and PUNCTURE.

But the principal disorders to which this part is subject, are abscesses and fistulas. See the articles ABSCESS and FISTULA.

PERINDE VALERE, a term in the ecclesiastical law, signifying a dispensation to a clerk, who, being deficient in his capacity, is nevertheless de facto admitted to a benefice, or other ecclesiastical function.

PERIOCHA, *περίοχη*, an argument indicating the sum of a discourse.

PERIOD, in astronomy, the time taken up by a star or planet in making a revolution round the sun; or the duration of its course till it return to the same point of its orbit. See the article ORBIT.

The periodical times of the planets round the sun are as follow:

| | | days. | hours. | min. | seconds. |
|---------------|---|-------|--------|------|----------|
| The period of | | | | | |
| Mercury | — | 87 | 23 | 15 | 53 |
| Venus | — | 224 | 16 | 49 | 24 |
| The earth | — | 365 | 6 | 9 | 14 |
| Mars | — | 686 | 23 | 27 | 30 |
| Jupiter | — | 4332 | 12 | 20 | 25 |
| Saturn | — | 10759 | 6 | 36 | 26 |

See MERCURY, VENUS, &c.

There is a wonderful harmony between the distances of the planets from the sun, and their periods round him; the great law whereof is, that the squares of the periodical times, of the primary planets, are to each other as the cubes of their distances from the sun; and likewise, the squares of the periodical times of the secondaries of any planet, are to each other as the cubes of their distances from that primary. This harmony among the planets is one of the greatest confirmations of

of the copernican hypothesis. See the article **COPERNICAN**.

For the periods of the moon and satellites of jupiter and saturn, see the articles **MOON** and **SATELLITE**.

The periods of several comets are now pretty well ascertained. See **COMET**.

PERIOD, in chronology, denotes a revolution of a certain number of years, or a series of years, whereby, in different nations, and on different occasions, time is measured; such are the following.

Calippic PERIOD, a system of seventy-six years. See **CALIPPIC PERIOD**.

The calippic period comprehends 48 common years, and 28 intercalary ones, 940 lunations, and 22759 days. See the article **CYCLE**.

Constantinopolitan PERIOD. See the article **JULIAN PERIOD**.

Dionysian PERIOD, or *Victorian PERIOD*, a system of 532 lunæ-solar and julian years, which being elapsed, the characters of the moon fall again upon the same day and feria, and revolve in the same order, according to the opinion of the antients.

This period is otherwise called the great paschal cycle, because the christian church first used it, to find the true time of the pascha, or easter. The sum of these years arise by multiplying together the cycles of the sun and moon. See the article **EASTER**.

Hipparchus's PERIOD, a system of 304 years, both lunar and solar, which being elapsed, Hipparchus thought that the reckoning by the lunar motion would coincide again with the solar measures. This period comprehends 3760 lunar months, or 111039 days; the sum of which arises from the multiplication of the calippic period by 4, subtracting unity from the product.

Julian PERIOD. See **JULIAN**.

Metonic PERIOD, that invented by Meton, being the same with the cycle of the moon. See the article **CYCLE**.

PERIOD, in grammar, denotes a small compass of discourse, containing a perfect sentence, and distinguished at the end by a point, or full stop, thus (.); and its members or divisions marked by commas, colons, &c. See the articles **POINT** and **SENTENCE**.

The celebrated definition of Aristotle is, that a period is a discourse which has a beginning, a middle, and an end, all visible at one view. And De Colonia
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defines a period a short but perfect sentence, consisting of certain parts or members, depending one upon another, and connected together by some common vinculum.

The periods allowed in oratory are three, a period of two members, called by the Greeks dicolos, and by the Latins bimembris; a period of three members, tricolos, trimembris; and a period of four, tetracolos, quadrimembris: however, it is possible to introduce a period of one member, called by Aristotle monocolos, or simple period; but it will be reputed a flaw, and is a thing never practised by orators. The period may likewise be prolonged to five or six members; but then it changes its name, and instead of period commences what they call a periodical discourse. The laws and measures of periods are pretty strictly regarded by orators, particularly the antients. In oratory, the members of a period should be equal, or nearly so, that the pauses, or rests of the voice, at the close of each member, may be nearly equal; however, in writing not intended for rehearsal, this is not regarded; and common discourse admits of periods, both longer and shorter than oratory.

Periods are said to be round or square, according to their different œconomy and cadences: square period is that consisting of three or four equal members, formally distinguished from each other; and a round period is that whose members or parts are so connected and fitted into each other, as that the junctures or commissures are scarce seen, but the whole sides equally round, without any notable stops or inequalities.

PERIOD is also used for the character (.) wherewith the periods of discourse are terminated, or expressed, being commonly called a full stop or point. See the article **PUNCTUATION**.

PERIOD, in numbers, a distinction made by a point, or comma, after every sixth place or figure; and is used in numeration for the readier distinguishing and naming the several figures or places, which see under **NUMERATION**.

PERIOD of a disease, in medicine, is the time between the access of one fit, or paroxysm, and that of the next, including the entire exacerbation, decline, and intermission, or remission. These, in some disorders, are very regular and constant, as in intermitting fevers; but in chro-

nical disorders, more irregular and uncertain, as in epilepsies: hence such diseases are called periodical.

PERIOD of the blood, is its circulation.

See the article **CIRCULATION**.

PERIODEUTA, a church-officer among the Greeks, established by the council of Laodicea, in towns where there were no bishops; being a kind of rural dean.

PERIODIC, or **PERIODICAL**, something that terminates and comprehends a period: such is a periodic month, being the space of time wherein the moon dispatches her period; a periodic disease, &c. See **MONTH**, **DISEASE**, **PERIOD**, &c.

PERIOECI, *περιοικοι*, in geography, such inhabitants of the earth, as have the same latitudes, but opposite longitudes; or live under the same parallel, and the same meridian, but in different semicircles of that meridian, or in opposite points of the parallel. These have the same common seasons throughout the year, and the same phenomena of the heavenly bodies; but when it is noon-day with the one, it is midnight with the other, there being twelve hours between them in an east or west direction. These are found on the globe, by the hour-index, or by turning the globe half round, that is 180 degrees either way. See the article **GLOBE**.

PERIOPHTHALMIUM, in natural history, the same with the nictitating membrane. See the article **NICTITATING MEMBRANE**.

PERIOSTEUM, or **PERIOSTIUM**, in anatomy, a nervous vasculous membrane, endued with a very quick sense, immediately surrounding, in every part, both the internal and external surfaces of all the bones in the body, excepting only so much of the teeth as stand above the gums, and the peculiar places on the bones, in which the muscles are inserted. It is hence divided into the external and internal periosteum, and where it externally surrounds the bones of the skull, it is generally called the pericranium. See the article **PERICRANIUM**.

This membrane serves to constitute the first rudiments of the bones in a foetus in utero. It is the organ of secretion for the bony matter, as the *membrana adiposa* is for the fat: all the bones, during the time of their growth, receiving from it their matter of accretion, and afterwards their nutriment. The blood-vessels of the periosteum penetrate in innumerable places into the bones themselves, as is

evidently seen in the fresh bones of children. The sensibility in the bones is wholly owing to this membrane; for when divested of this, they may be sawed, cut, or burnt without pain. It gives the determination and figure to bones, as is evident from this, that when it is wounded, exostoses, tophi, and caries arise in the part. The periosteum is of different thickness in different parts, but in general the internal is vastly thinner than the external, and serves to nourish that part of the bones. It receives also nerves and blood-vessels from the outside, through certain canals in the substance of the bones, which it communicates to the marrow in such as have any. It is generally said to arise from the dura mater of the brain; but Heister thinks this opinion scarce right, as the periosteum is evidently formed at the same time with the dura mater in the foetus.

PERIPATETIC PHILOSOPHY, that system taught and established by Aristotle, and maintained by his followers, the peripatetics, called also aristotelians.

The greatest and best part of Aristotle's philosophy, he is said to have borrowed from his master Plato. Serranus affirms confidently, and says that he is able to demonstrate it, that there is nothing exquisite in any part of Aristotle's philosophy, dialectics, ethics, politics, physics, or metaphysics, but is found in Plato: and of this opinion are many of the ancient authors, Clemens Alexandrinus, &c. Aristotle's philosophy preserved itself in *puris naturalibus*, a long time, none of his followers or commentators having dared to make any innovation therein, till the beginning of the XIIIth century, when it began to be new modelled. A reformed system of peripateticism was first introduced into the schools in the university of Paris, from whence it soon spread throughout Europe, and has subsisted in the universities to this day, under the name of school philosophy; the foundation whereof is Aristotle's doctrine frequently misunderstood, and oftner misapplied: but of these, at different times, have sprung several branches, as the thomists, scotists, nominalists, &c. See the article **THOMISTS**, &c.

PERIPETIA, *περιπέτεια*, in the drama, that part of a tragedy, wherein the action is turned, the plot unravelled, and the whole concludes. See the article **CATASTROPHE**.

The qualities of the peripetia are, that it be

be probable and necessary; in order to which it must be the natural result, at least the effect of the foregoing action, or of the subject itself, and must not start from any foreign or collateral cause. The peripetia is sometimes induced by remembrance or discovery, and sometimes without any discovery.

PERIPHERY, in geometry, the circumference of a circle, ellipses, or any other regular curvilinear figure. See the article **CIRCUMFERENCE**, **CIRCLE**, &c.

PERIPHRASIS, in rhetoric, the same with circumlocution. See the article **CIRCUMLOCUTION**.

PERIPLOCA, **CLIMBING DOG'S BANE**, in botany, a genus of the pentandria-digynia class of plants, the corolla whereof consists of a single plane petal, divided into five oblong, linear, truncated, and emarginated segments; the fruit consists of two large, oblong, ventricose follicles, each formed of a single valve, and containing one cell: the seeds are numerous, imbricated, and coronated with down; the receptacle is longitudinal and capillary.

PERIPNEUMONY, in medicine, an inflammation of the lungs attended with a weight in the lungs, a difficulty of breathing, and an oppression of the breast, with a purulent spitting, and a fever accompanied with a cough. When the inflammation affects both the lobes, and the whole body of the lungs, the case is desperate.

The peripneumony is distinguished into two kinds; one of which has its seat at the extremity of the pulmonary artery, and is called the true peripneumony; and the other is situated in the bronchial arteries, and is called the spurious or bastard peripneumony.

The true peripneumony is often cured by a critical resolution and concoction of the morbid matter, which is either attenuated, so as to be returned into the channels in the common course of circulation, or expectorated by coughing; which may be easily known by an abatement of the symptoms, and the patient's falling into gentle breathing sweats.

Copious bleeding is the most effectual remedy in the beginning of this disease; but not so proper when expectoration goes on successfully, because it sometimes suppresses it, and in that case sudorifics thicken the matter which is expectorated. The motions of nature ought to be followed; the aliment ought to be more

slender and thin than in any other inflammatory disease whatsoever; common whey is sufficient to preserve the strength of the patient; relaxing aliments are proper, of which barley, and all its preparations, are the best. Diuretics that have not much acrimony are useful; and for this intention, an infusion of fennel-roots in warm water, with milk, is good. If nature relieves by a diarrhoea, without sinking the strength of the patient, it ought to be promoted by emollient clysters. But if the patient is neither relieved nor dies in eight days, the inflammation will end in a suppuration, and an abscess of the lungs, and sometimes in some other part of the body: in this case bleeding must be forborne; the diet must be mild, soft, inkrassating, and more plentiful; and tepid vapours should be taken into the lungs, from decoctions of proper ingredients. When, by the symptoms and time, the imposthume may be judged to be ripe, the vapour of vinegar, and any thing that creates a cough, are proper; for the sooner it is broke, the less danger will the lungs be in. In this state, which is not absolutely desperate, the aliment ought to be milk, and the drink milk and barley-water with gentle anodynes, that the patient may have some rest.

Spurious, or Bastard PERIPNEUMONY, a disease of the lungs, which generally arises from a heavy pituitous matter generated in the blood, and cast upon the lungs. In this disorder the patient is hot and cold by turns, is giddy upon the least motion, and complains of a rending pain of the head whenever he coughs; he vomits up every thing that he drinks; the urine is turbid and red, and the whole thorax full of pain. In this disorder the patient should be let blood from a large orifice; and then give him the following clyster, which must be repeated daily, till the symptoms evince that the lungs are relieved: take of honey, three ounces; of nitre, one dram; one yolk of an egg; and eight ounces of barley-water; make them into a clyster. Let the patient's diet be very slender, such as weak broths, sharpened a little with orange or lemon-juice; and he may drink a weak mixture of honey and water: the steams of warm water may be taken in at the mouth, and the following decoction given him: take of the roots of fennel, two ounces; of the roots of grass, four ounces; of the leaves of pellitory,

and agrimony, each an handful and a half; of the bruised seeds of white poppy, one ounce; and of liquorice, one ounce and an half; boil them, for a quarter of an hour, in two pints and a half of water: of which let the patient drink two ounces every two hours. Likewise let his legs and feet be bathed, and large blisters applied.

PERIPTERE, in the antient architecture, a building encompassed on the outside with a series of insulated columns, forming a kind of portico all around; such were the portico of Pompey, the septizon of Severus, and the basilica of Antoninus.

The peripteres were properly temples, which had columns on all the four sides, by which they were distinguished from the prostyle and amphiprostyle, the last of which had no columns before, and the first none on the sides.

M. Perault observes, that periptere, in the general sense of the word, is the name of a genus, including all the species of temples, which have porticos of columns all around, whether the columns be diptere, or pseudo-diptere, or simply periptere, which is a species that bears the name of a genus, and which has its columns distant from the wall, the breadth of an intercolumnation.

PERISCHII, in geography, the inhabitants of either frigid zone, between the polar circles and the poles; where the sun, when in the summer-signs, moves only round about them, without setting, and consequently their shadows, in the same day, turn to all the points of the horizon.

PERISKYTISM, in antient surgery, an incision made under the coronal suture, reaching from one temple across to the other, penetrating to the bone of the cranium.

PERISTALTIC, in medicine, a vermicular spontaneous motion of the intestines, performed by the contraction of the circular and longitudinal fibres, of which the fleshy coats of the intestines is composed; by means whereof the chyle is driven into the orifices of the lacteal veins, and the fæces are protruded towards the anus. See **CHYLIFICATION**.

When this motion comes to be depraved, and its direction changed, so as to proceed from below upwards, it produces what is called the iliac passion. See the article **ILIAC PASSION**.

PERISTAPHYLINUS, in anatomy, a

name which some give to a muscle of the uvula, more properly denominated pterygostaphylinus. See the articles **UVULA** and **PTERYGOIDÆUS**.

PERISTYLE, in antient architecture, a building encompassed with a row of columns on the inside: such was the hypæthre temple of Vitruvius, and such are now some basilicas in Rome, several palaces in Italy, and most cloisters of religious.

Peristyle is also used by modern writers, for a range of columns, either within or without a building: thus we say, the corinthian peristyle of the portal of the Louvre, &c.

PERISYSTOLE, in medicine, the interval of rest between the two motions of the heart, viz. that of the systole, or contraction, and that of the diastole, or dilatation.

PERITONÆUM, in anatomy, is a thin, smooth, and lubricous membrane, investing the whole internal surface of the abdomen, and containing most of the viscera of that part, as it were in a bag. It lies immediately under the transverse muscles of the abdomen, and adheres to them, and also coheres with the diaphragm, and with all the viscera lodged in this part. It entirely incloses the stomach, the intestines, the mesentery, the omentum, the liver, the spleen, and the pancreas: as to the kidneys, ureters, and smaller vessels of the abdomen, it covers them only on the anterior part, and the urinary bladder only on the posterior. The peritonæum is composed of a double membrane, or lamella; the exterior one has longitudinal and slender fibres, and the interior transverse and more robust ones. There are also ligaments formed from it, viz. that which suspends the liver, and the two ligamenta lata of the uterus in women. Its processes, sent out of the abdomen, are two, and these serve to surround and inclose the spermatic vessels and the testicles.

The arteries and veins of the peritonæum are supplied from the epigastric, mammary, lumbar, and diaphragmatic vessels; and the nerves are propagated from those of the diaphragm, back, loins, and os sacrum.

The use of the peritonæum are, 1. To inclose the contents of the abdomen; for when this part is dilated, wounded, or broken, they fall out of their due places, and ruptures are formed. 2. To give an external covering to almost all the parts

parts contained in the abdomen, which are therefore generally said to have their external membrane from the peritonæum. And, 3. To form the process of the peritonæum, and the tunica vaginalis of the testes.

PERITROCHIUM, in mechanics, denotes a wheel, or circle, concentric with the base of a cylinder, and moveable together with it, about an axis. See the article **AXIS** IN **PERITROCHIO**.

PERJURY, in law, the crime of swearing falsely, where a lawful oath is administered by one in authority, in a matter relating to the issue or cause in question, whether it be a person's own wilful act, or done by the subornation of others. See **OATH** and **SUBORNATION**;

In order to make an offence perjury, it must appear to be wilful and deliberate, and not done through surprize or inadvertency: it must be direct and positive, and not where a person swears as he thinks or believes: but in case a person swears to what he is ignorant of, it is a false oath, even though what he swears should happen to be true; thus, a plaintiff caused two persons to swear to the value of goods, which they never saw, when, notwithstanding they swore what was true, it was adjudged to be perjury in them. At the common law, perjury, and the subornation of it, are punishable by fine, imprisonment, pillory, transportation, &c. Persons committing perjury in a cause concerning lands, goods, &c. depending in a court of record, shall forfeit 20 l. be imprisoned for six months, and be rendered incapable of giving evidence in any court, till the judgment is reversed; and if offenders have not goods to the value of the fine, they are to be set in the pillory, in some market-place, and have their ears nailed thereto. When a person suborns a witness to give false testimony in a court of record, he forfeits 40 l. and if he be not worth so much, shall suffer six months imprisonment, and stand in the pillory, &c.

PERIWINKLE, in the history of shellfish, a species of buccinum. See the article **BUCCINUM**.

PERMANENT, in general, something that continues the same, whether in nature or situation, and other circumstances: thus, air generated by fermentation, is said to be permanent, because it continues to shew all the natural properties of common air. See **AIR**.

Thus also those cups of flowers are called

permanent, which remain after the flower-leaves are fallen.

PERMEABLE, a term applied to bodies of so loose and porous a structure, as to let something pass through them.

PERMIA, a province on the north-east part of european Muscovy, separated from Asia by the river Oby.

PERMUTATION, in commerce, the same with bartering. See **BARTERING**.

In the canon-law, permutation denotes the actual exchange of one benefice for another.

PERMUTATION of quantities, in algebra, the same with combination. See the article **COMBINATION**.

PERNAMBUCO, a province of Brasil, in America, bounded by the province of Tamera on the north, by the Atlantic ocean on the east, by the province of Seragippa on the south, and by the country of the Tapuyers on the west; being two hundred miles long, and one hundred and fifty broad.

PERNANCY, in law, signifying taking or receiving, is peculiarly applied to tithes taken in kind. See **PERNOR**.

PERNES, a town of the french Netherlands, of the province of Artois, situated fifteen miles south-east of St. Omers.

PERNIONES, **CHILBLAINS**, or **KIBES**, in surgery, a name given to those tumours, which happen in the hands and feet from violent cold. See the article **COLD**.

Chilblains are accompanied with inflammation, heat, redness, pricking pain, and immobility of that limb: sometimes they are of a livid or leaden colour, and sometimes they break out with scabs, or else with chops, or flits, which afterwards penetrate deeper, and become ulcerous. The humour which they discharge is a little foetid, and pretty much resembles pus or sanies; and they terminate in either dispersion, suppuration, or gangrene and sphacelus. See the article **DISPERSION**, &c.

While the chilblains are yet tumified and red, and the part retains its sense and motion, without any great heat and pain, the disorder is then of the mildest kind; on the contrary, when they are livid, occasion the limb to become stiff and insensible, or excite pricking pains therein, there is then danger of a worse consequence, lest it should degenerate into a gangrene, or at least a deep exulceration. There being no room to doubt but that cold is the cause of chilblains, it readily follows that the cure must consist chiefly

in restoring the blood to its former fluidity and free circulation as soon as possible; for which purpose an external as well as internal treatment is necessary. In the external treatment, the patient being exposed in a temperate air, should according to Heister, exercise his limbs as much as possible, in order to advance him still to a greater warmth or heat; but when he is too weak to exercise himself, it will be proper to bath the parts affected with snow, or cold water; after which, when the limb becomes sensible, comfortable medicines may be applied, such as spirit of wine, either pure, or with theriaca, rock-oil, balsam of sulphur, &c. When the parts affected have been well rubbed or bathed with these, the patient may then be advanced towards the fire, or be put to bed, endeavouring afterwards to excite a gentle sweat.

In the internal treatment, great service will be had from a few glasses of hot wine, wherein has been boiled some cinnamon and sugar; though it may not be improper to give with this alternately, a small quantity of some sudorific mixture. If the wine be not at hand, good ale boiled with cinnamon, cloves, and sugar, may well enough supply its place. It should be continued so as to keep up a sweat for a whole hour, for half an hour, or according to the several circumstances: but if the disorder is much slighter, this method is not then so directly necessary; it may then be laid aside: though, in the opinion of Heister, it is much preferable to any other method. When chilblains tend to a suppuration, then it is proper to treat them like other abscesses. See the article ABSCESS.

If a patient has before been troubled with chilblains, which are used to return every year in the winter, the preservative against the disorder is to anoint the parts affected with petroleum, or oil of turpentine, before and after the severity of the winter comes on; but when the disorder has begun to shew itself again by tumour, inflammation, and pain, the heel or finger may be wrapped up in a swine's bladder, dipped in the forementioned oil; and the cold itself should always be carefully avoided by proper cloths or coverings.

PERNOR of profits, in law, he who takes the profits of lands, &c. and on seizure, the king shall have the lands of an outlawed person, and the profits thereof,

notwithstanding they are aliened by the outlaw.

PERONE, in anatomy, the same with fibula. See FIBULA. Hence,

PERONÆUS, in anatomy, is an epithet applied to some of the muscles of the perone or fibula. 1. The peronæus anticus, is a muscle that arises at the anterior part of the middle of the fibula, and terminates at the exterior metatarsal bone; the office of this muscle is to draw the foot upwards. 2. Peronæus posticus is a muscle that arises at the upper part of the fibula, but its tendon is turned back under the tarsus, and is inserted into that bone of the metatarsus, which supports the great toe. There is usually in old subjects a sesamoide bone in the tendon of this muscle, where it passes under the os cuboides. Its office is also to pull the foot upwards. See MUSCLE.

PERONNE, a city of France, in the province of Picardy, situated on the river Somme, twenty-three miles north-east of Amiens.

PERORATION, *peroratio*, in rhetoric, the epilogue, or last part of an oration, wherein what the orator had insisted on through his whole discourse, is urged afresh with greater vehemence and passion. The peroration consists of two parts. 1. Recapitulation, wherein the substance of what was diffused throughout the whole speech is collected briefly, and cursorily, and summed up with new force and weight. 2. The moving the passions, which is so peculiar to the peroration, that the masters of the art call this part *sedes affectuum*. The passions to be raised are various, according to the various kinds of oration. In a panegyric, love, admiration, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear. The qualities required in the peroration are, that it be very vehement and passionate, and that it be short; because, as Cicero observes, tears soon dry up.

PEROUSA, a town of Italy, in the province of Piedmont, capital of one of the vallies of the Vaudois, situated twelve miles south-west of Turin.

PERPENDICULAR, in geometry, a line falling directly on another line, so as to make equal angles, on each side; called also a normal line: thus the line A B, plate CXC VII. fig. 2. n^o 1. is perpendicular to the line C D. i. e. it makes right

right angles therewith. See ANGLE. From the very notion of a perpendicular it follows; 1. That the perpendicularity is mutual, *i. e.* if a line, as *AB*, be perpendicular to another *CD*, that other is also perpendicular to the first. 2. That only one perpendicular can be drawn from one point in the same place. 3. That if a perpendicular be continued through the line it was drawn perpendicularly to, the continuation will also be perpendicular to the same. 4. That if there be two points of a right line, each of which is at an equal distance from two points of another right line, that line is perpendicular to the other. 5. That line which is perpendicular to another is also perpendicular to all the parallels of the other. 6. That a perpendicular line is the shortest of all those which can be drawn from the same point to the same right line.

Hence, the shortest distance of a point from a line is a right line drawn from the point perpendicular to the line, or plane; and hence the altitude of a figure is a perpendicular let fall from the vertex to the base.

To raise, from the point *A*, (*ibid.* n^o 2.) a line perpendicular to the line *BC*; make *AB = AC* and from the points *B* and *C* as centers, with the same opening of the compasses, describe two arches cutting each other in the point *D*, and the line *DA* shall be the perpendicular required; that is, the angles *DAB*, *DAC*, shall be equal; because all the sides of the triangle *DAB* will be equal to all the sides of the triangle *DAC*.

To let fall a perpendicular upon a line *BC* (*ib.* n^o 3.) from a point given without it *A*; on the point *A* describe an arch which shall cut the line in the points *B* and *C*; then making the equilateral triangle *BEC* (by prop. 1. lib. i. of Euclid) the line *AE* shall be perpendicular to the line *BC*. For since the triangles *ABD* and *ACD* have the side *AD* common, and *AB* is equal to *AC*, and the angle *BAD* is equal to the angle *CAD*, they are equal in every respect by prop. 4. lib. i. of Euclid; and the angle *D* equal on each side: therefore by the definition the line *AD* is perpendicular to the line *BC*.

To erect a perpendicular on the end of a given line, suppose at *R*, (*ibid.* n^o 4.) open your compasses to any convenient distance; and setting one foot in *C*, draw the semi-circle *PRS*. Lay a ruler from *S*

thro' *C*, and it will find the point *P* in the circumference: whence draw *PR*, which is the perpendicular required. For the angle *PRS* being in a semi-circle must be a right one by prop. 31. lib. iii. of Euclid, and consequently *PR* must be perpendicular to *SR*.

A line is said to be perpendicular to a plane when it is perpendicular to more than two lines drawn in that plane; and a plane is said to be perpendicular to another plane, when a line in one plane is perpendicular to the other plane.

PERPENDICULAR to a parabola is a right line cutting the parabola in the point in which any other right line touches it, and is also itself perpendicular to that tangent.

PERPENDICULARITY of plants, in natural history, a quality observed in all plants, which though they rise a little crooked, yet the stems shoot up, and the roots sink down, as much as possible in a perpendicular direction. This curious phenomenon was first observed by M. Dodart, who published an express essay on the affectation of perpendicularity observed in the stems or stalks of all plants, in the roots of many, and even in their branches. He observes, that such plants, or parts of plants, as by the declivity of the soil come out inclined, or such as are diverted out of the perpendicular by any violent means, again redress and straighten themselves, and recover their perpendicularity by making a second or contrary bend or elbow without rectifying the first.

PERPETUAL, something that endures always, or lasts for ever.

It is sometimes also used for a thing that lasts or holds during a person's life: thus offices, &c. held *durante vita*, are sometimes called perpetual offices.

PERPETUAL GLANDS, in anatomy, are those which are natural, thus distinguished from the adventitious ones.

PERPETUAL MOTION, or MOVEMENT. See the article MOVEMENT.

PERPETUAL OCCULTATION. See the articles OCCULTATION.

PERPETUITY, in law, is when an estate is intended to be so settled in tail, &c. that it may not possibly be undone, or made void.

This is a thing the law will not suffer, on which account all perpetuities are avoided: for example, an estate cannot be made to deprive a tenant in tail, either by condition or limitation, of the power of

of alienation by fine and recovery, &c. and a term for years may not be devised to one and the heirs of his body, as an estate-tail with remainders over, to create a perpetuity, though it may be assigned to trustees for the issue in tail to receive the profits, &c.

Perpetuity, in the canon law, is the quality of a benefice that is irrevocable, or whose incumbent cannot be deprived; except in certain cases, determined by law.

PERPIGNAN, a city of Spain, in the province of Catalonia, capital of the territory of Roussillon, situated on the river Latet, in east long. $2^{\circ} 35'$, north lat. 43° .

PER QUÆ SERVITIA, a judicial writ, which issues on the note of a fine, and lies for the cognisee of a manor, lands, rents, or other services, to compel the tenants thereof at the time of the fine levied to attorn to him. See **COGNISEE**.

PERQUISITE, in law, is any thing gotten by a man's own industry, or purchased with his money; in contradistinction to what descends to him, from his father or other ancestor.

PERQUISITES of courts, are the profits which casually accrue to a lord of the manor from his courts-baron, by fines for copyholds, escheats, heriots, amercements, &c.

PERRIWIG, or **PERRUKE**. See the article **PERRUKE**.

PERRON, in architecture, the steps in the front of a building, raised before the doors of great houses, and leading to the first story, when raised above the level of the ground.

Perrons are made of different forms and sizes according to the space and height they are to lead to: sometimes the steps are round, or oval, but more usually they are square. Where a perron is thirteen or fifteen steps high, their range ought to be interrupted by one or two landing places, that there may not be too many steps to mount successively, and that the eye may not be displeased by viewing so great a height without rests. A perron should always be confined to the height of the zocle, or foot of the whole building.

PERROQUET, or **PARROQUET**. See the article **PARROQUET**.

PERRUKE, or **PERRIWIG**, was antiently used for a head of long natural hair, particularly such as was curled and adjusted with great care. But it is now

used for a set of borrowed hair, curled, baked, interwoven between four threads, and sewed together on a cawl.

It is doubted whether the use of perrukes was known among the antients. It is true, they used false hair; but this seems to have had scarce any thing in common with our perrukes, and was at best only composed of hair glued together. Nothing can be more ridiculous than the description Lampridius gives of the emperor Commodus's perruke, which was greased with glutinous perfumes, and powdered with scrapings of gold. In reality, the use of perrukes, at least on their present footing, is not much above a hundred years old: the year 1629, is reckoned the epocha of long perrukes; at which time they began to appear at Paris, from whence they spread by degrees through the rest of Europe.

PERRY, a drink made of pears, in the same manner as cyder is made from apples. See the article **CYDER**.

The pears must be perfectly ripe, and to give the liquor a greater degree of tartness, some mix crabs with them. The best fruit for making perry, is such as is least fit for eating, as the choak-pear, boreland-pear, horse-pear, and the barbery-pear.

PER SE, in the schools, is sometimes opposed to *per accidens*; in which sense, a thing is said to agree with another *per se*, when the agreement is not owing to any accidental event, but is found in the intrinsic principles of things themselves. It is sometimes opposed to *per aliud*; in which sense, God alone is said to have a being *per se*, as not deriving it from any other, but having it necessarily and of himself. *Per se* again signifies as much as of its own nature, or by virtue of its own entity: thus, the sun is said to give light *per se*, and thus quantity is extended *per se*.

Among logicians a thing is said to be known *per se*, *per se notum*, when we immediately perceive it upon the first proposing of the terms, as that the whole is greater than any one of its parts. Philosophers go so far as to consider the mode of a thing existing *per se*, or that which constitutes its existence such, which they call *perseity*, or *perseitas*.

Among chemists, when a body is distilled singly, and without the usual addition of any other matter to raise it, it is said to be distilled *per se*.

PERSECUTION, is any pain or affliction which

which a person designedly inflicts upon another; and, in a more restrained sense, the sufferings of christians on account of their religion.

Historians usually reckon ten general persecutions, the first of which was under the emperor Nero, thirty one years after our lord's ascension; when that emperor having set fire to the city of Rome, threw the odium of that execrable action on the christians, who under that pretence were wrapped up in the skins of wild beasts, and worried and devoured by dogs; others were crucified, and others burnt alive. The second was under Domitian, in the year 95. In this persecution St. John the apostle was sent to the isle of Patmos, in order to be employed in digging in the mines. The third began in the third year of Trajan, in the year 100, and was carried on with great violence for several years. The fourth was under Antoninus the philosopher, when the christians were banished from their houses, forbidden to shew their heads, reproached, beaten, hurried, from place to place, plundered, imprisoned and stoned. The fifth, began in the year 197, under the emperor Severus. The sixth, began with the reign of the emperor Maximinus in 235. The seventh, which was the most dreadful persecution that had ever been known in the church, began in the year 250, in the reign of the emperor Decius, when the christians were in all places driven from their habitations, stripped of their estates, tormented with racks, &c. The eighth began in the year 257, in the fourth year of the reign of the emperor Valerian. The ninth was under the emperor Aurelian A. D. 274, but this was very inconsiderable: and the tenth began in the nineteenth year of Dioclesian, A. D. 303. In this dreadful persecution, which lasted ten years, houses filled with christians were set on fire, and whole droves were tied together with ropes, and thrown into the sea.

PERSEES, the same with gaur. See the article GAURS.

PERSEPOLIS, formerly a city of Persia, but now in ruins. Here are the most magnificent remains of a palace, or temple, that are now in being on the face of the earth: east long. 54°, north lat. 30° 30'.

PERSEVERANCE, in theology, a christian virtue, by which we are enabled to persist in the way of salvation to the end.

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The final perseverance of the saints is a doctrine much controverted between the arminians and calvinists; the latter of whom maintain, that it is impossible for grace to be lost, and consequently make perseverance to the end a necessary consequence thereof; while the others imagine, that the most confirmed believers are never out of a possibility of falling.

PERSEUS, in astronomy, a constellation of the northern hemisphere, which, according to the catalogues of Ptolemy and Tycho, contains twenty-nine stars; but in the britannic catalogue, sixty-seven.

PERSHORE, a market-town of Worcestershire, ten miles south-east of Worcester.

PERSIA, a large kingdom of Asia, 1200 miles long, and almost as much broad; situated between 45° and 67° of east longitude, and between 25° and 45° of north latitude; bounded by Circassian Tartary the Caspian Sea, and the river Oxus on the north; by Indian, on the east; by the Indian Ocean, and the gulphs of Ormus and Persia, on the south; and by the turkish empire on the west.

PERSIAN, in general, something belonging to Persia, as the Persian empire, language, &c.

The persian tongue has two peculiarities not to be met with in any other of the eastern languages; the one, that it has an auxiliary verb answering to the verb *εἶμι* of the greeks; the other, that it has an aoristus. These peculiarities it borrowed from the Macedonians, after the conquest of Alexander.

PERSIAN-WHEEL, an engine, or wheel, turned by a rivulet, or other stream of water, and fitted with open boxes at its cogs, to raise water for the overflowing of lands, or other purposes. See the article OVERFLOWING.

It may be made of any size, according to the height the water is to be raised to, and the strength of the stream by which it is turned. This wheel is placed so, that its bottom only is immersed in the stream, wherein the open boxes at its cogs are all filled one after another with water, which is raised with them to the upper part of the wheel's circuit, and then naturally empties itself into a trough which carries it to the land.

PERSICA, the PEACH, is only a species of the amygdalus, or almond-tree. See the article AMYGDALUS.

The serratures of its leaves are acute; the

the flowers are of a pale red; and the fruit is large and succulent, and contains a large stone. See plate CC. fig. 1. It is a native of Persia, whence it got the name of *malus persica*: a syrup of its flowers is a gentle-emetic.

PERSICARIA, ARSMART, in botany, a genus of the octandria trigynia class of plants, with a monopetalous flower, divided into five oval segments, alternately patent and connivent: there is no pericarpium, the seed, which is single, and of an oval compressed figure, being contained in the flower-petal, which is permanent.

There is great irregularity in this genus; there being in this species only five stamina; and in others six, or eight.

The mild or spotted arsmart is said to be a good vulnerary and antepileptic: and the biting arsmart is a good stimulating medicine, and diuretic: its fresh leaves are also used by farriers for cleansing old ulcers.

PERSON, an individual substance of a rational or intelligent nature. Thus we say, an ambassador represents the person of his prince; and that in law, the father and son are reputed the same person.

In theology, the godhead is divided into three persons; but here the word person is designed to convey a peculiar idea, very different from that attached to it every where else; it being only used for want of another term more pertinent and expressive. See **TRINITY**.

PERSON, in dramatic poetry, the character assumed by an actor, or he who is represented by the player. Thus, at the head of dramatic pieces, is placed the *dramatis personæ*, or list of the persons that are to appear on the stage. Father Boscu observes, that in the epic and dramatic poem the same person must reign throughout; that is, must sustain the chief part through the whole piece, and the characters of all the other persons must be subordinate to him. See the articles **TRAGEDY**, **CHARACTER**, &c.

PERSON, in grammar, a term applied to such nouns or pronouns, as being either prefixed or understood, are the nominatives in all inflexions of a verb; or it is the agent or patient in all finite and personal verbs. See the article **NOMINATIVE** and **VERB**.

There are three persons of a verb; as *I love*, is a verb used in the first person; *thou lovest*, is the verb used in the second

person; and *he loveth*, makes the third person; and thus in the plural number; the dual number of the Greeks have the second and third persons dual, as, *ye two love*, *they two love*, &c. *I*, *thou*, *he*, are pronouns of the first second, and third person singular. *We*, *ye*, *they*, of the first, second, and third persons plural. The first person is that which speaks, the second is that to whom the speech is directed, and the third is that whom the discourse concerns. In the latin and greek languages the person of a verb is no more than the different terminations of that verb in every tense.

PERSONABLE, in law, signifies the being able to maintain a plea in court; especially in the plea of an alien, who may be made personable by act of parliament.

It is also used to signify a capacity to receive any thing granted or given.

PERSONAL, any thing that concerns, or is restrained to, the person: thus it is a maxim in ethics, that all faults are personal.

PERSONAL ACTION, in law, is an action levied directly and solely against the person; in opposition to a real or mixed action. See the article **ACTION**.

PERSONAL GOODS, or chattels, in law, signifies any moveable thing belonging to a person, whether alive or dead. See the article **CHATTELS**.

PERSONAL TYTHES, are tythes payable out of the profits obtained by a man's personal labour and industry, as in buying, selling, handicraft, &c.

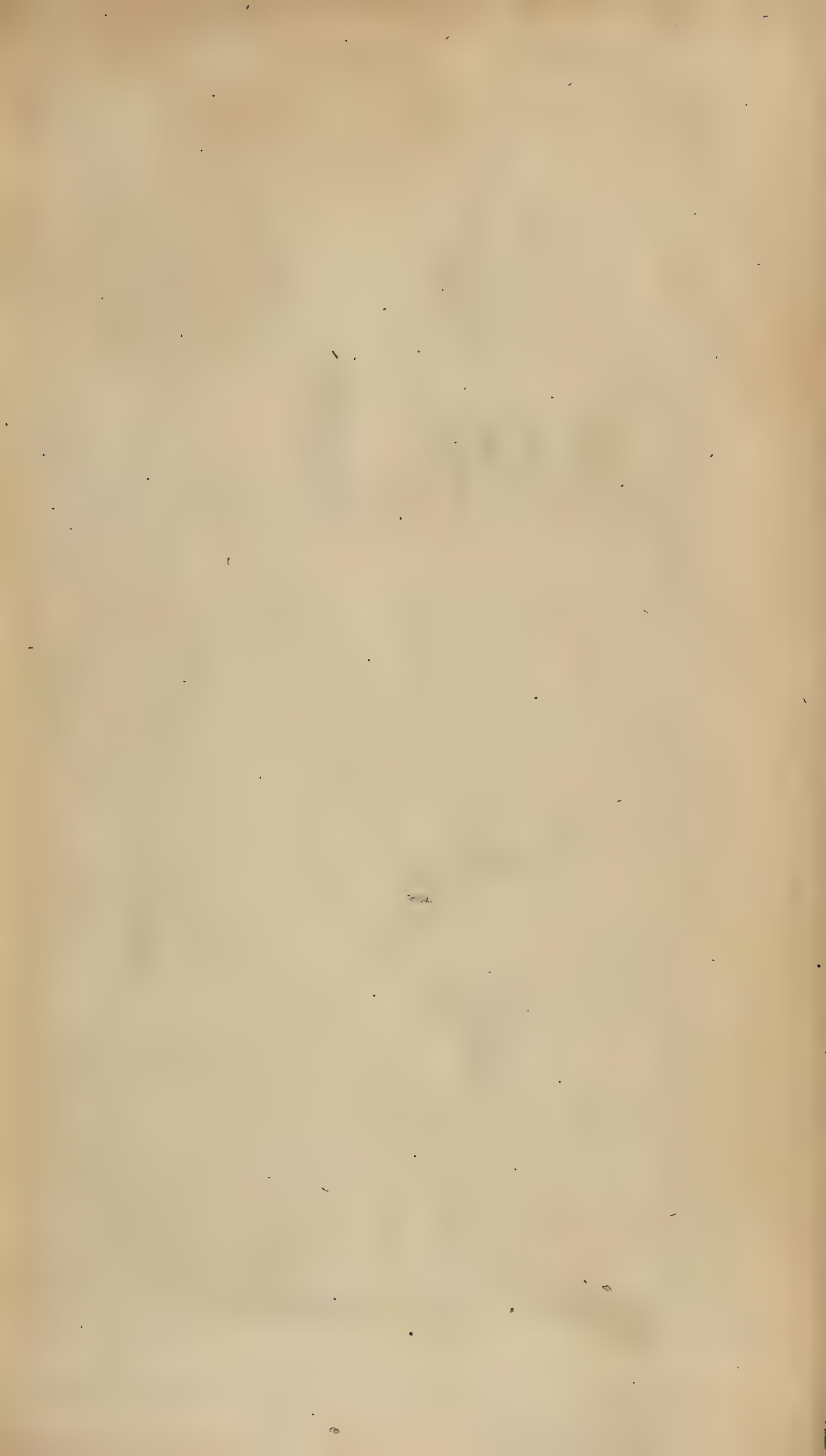
PERSONAL VERB, in grammar, a verb conjugated in all the three persons; thus called, in opposition to an impersonal verb, or that which has the third person only. See the article **IMPERSONAL VERB**.

PERSONALITY, in the schools, that which constitutes an individual or distinct person.

The school-divines are divided about what it is, that distinguishes the several personalities in the Trinity; some will have it to be only the different relations, others contend for its being some incommunicable substance, and others take the personalities to be distinguished by different origins. See **TRINITY**.

PERSONALITY, or **PERSONALTY**, in law, is sometimes used for person: thus an action is said to be in personality when it is brought against the right person.

PERSONATED-FLOWERS, among botanists are flowers which resemble the
gaping



PERSPECTIVE

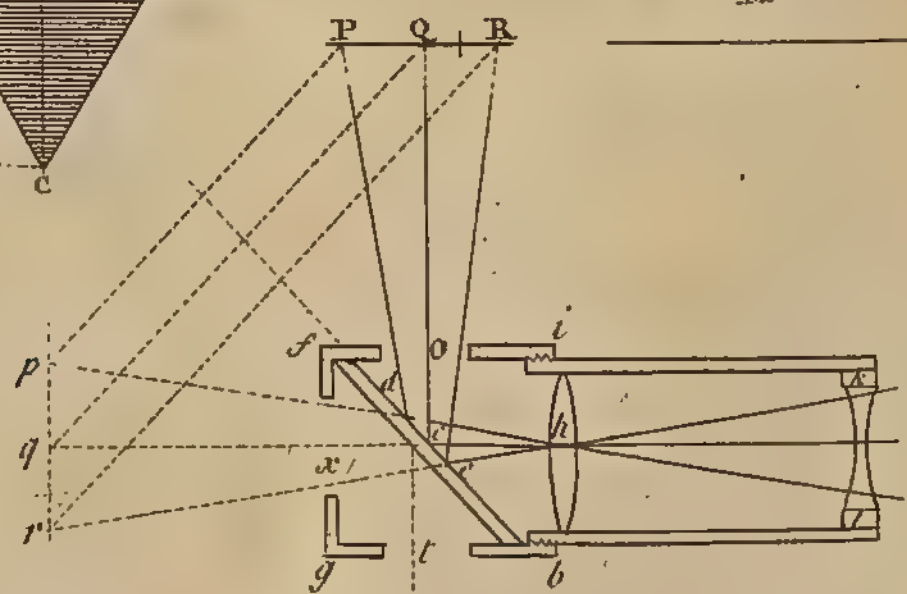
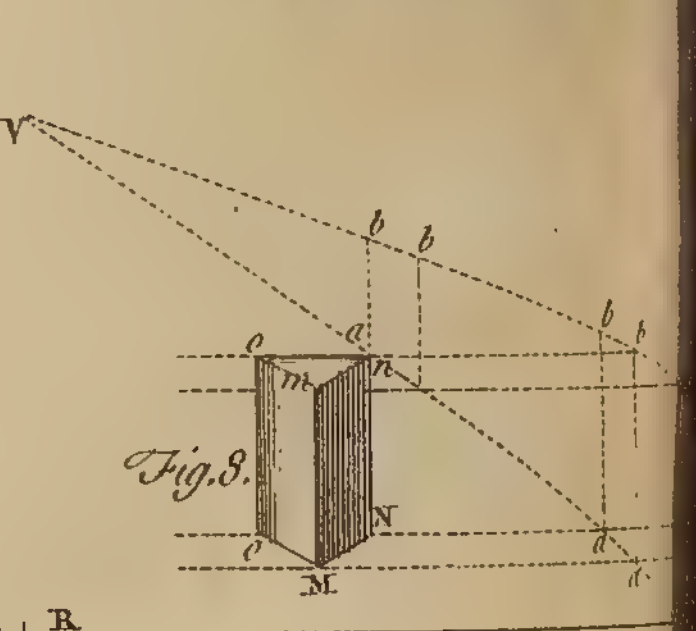
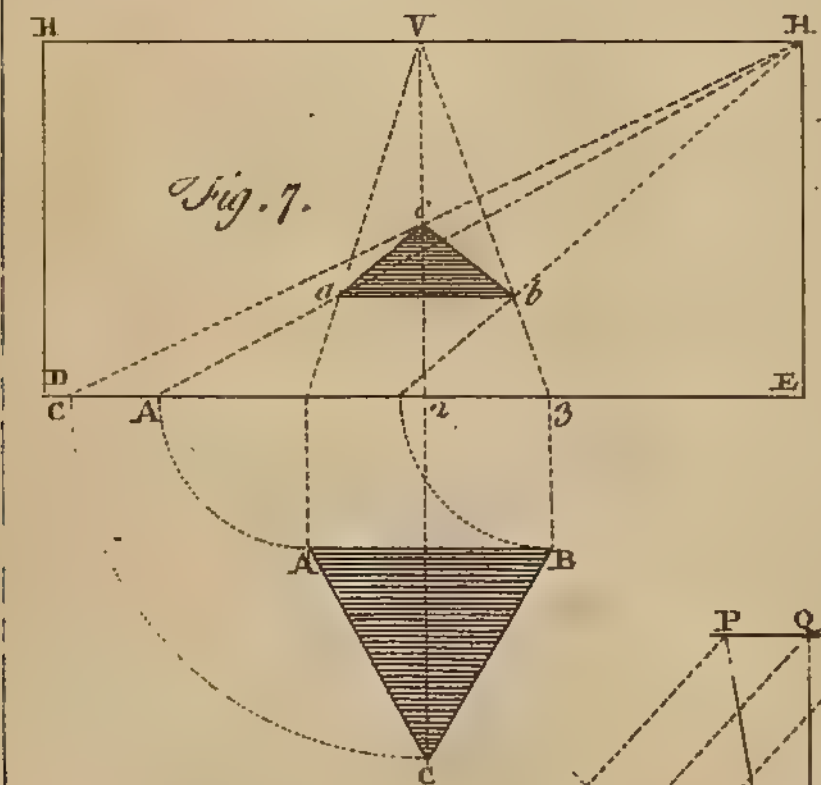
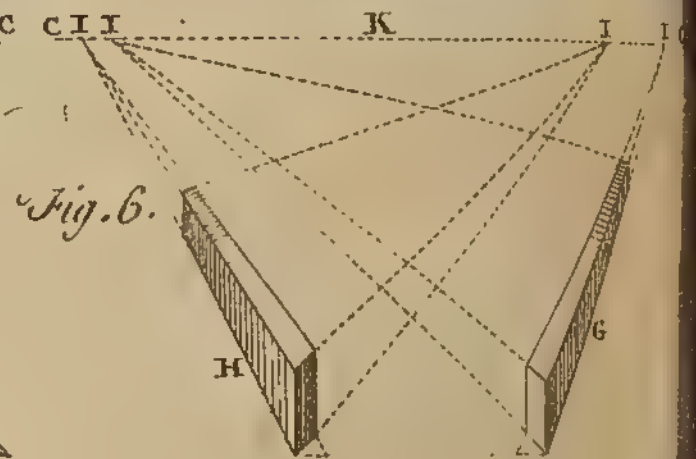
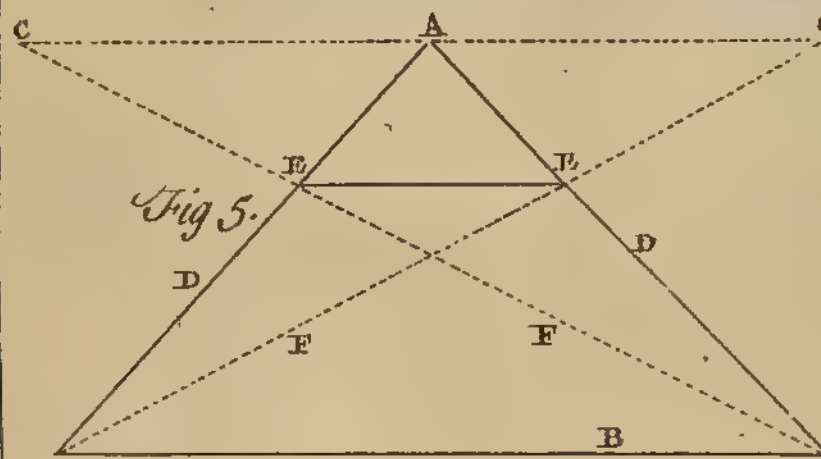
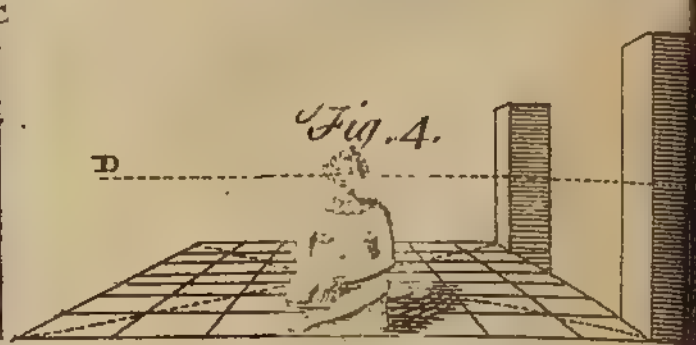
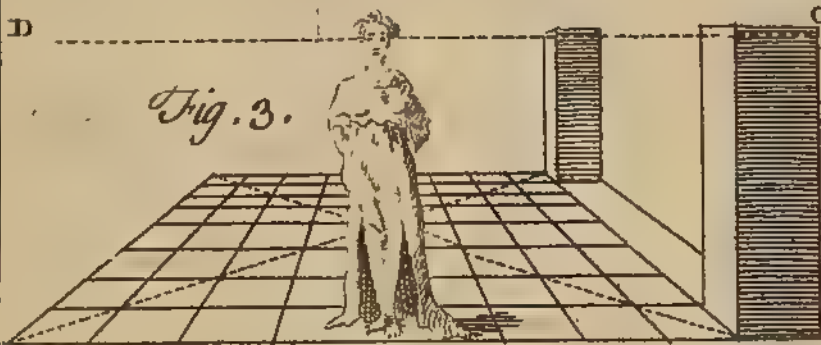
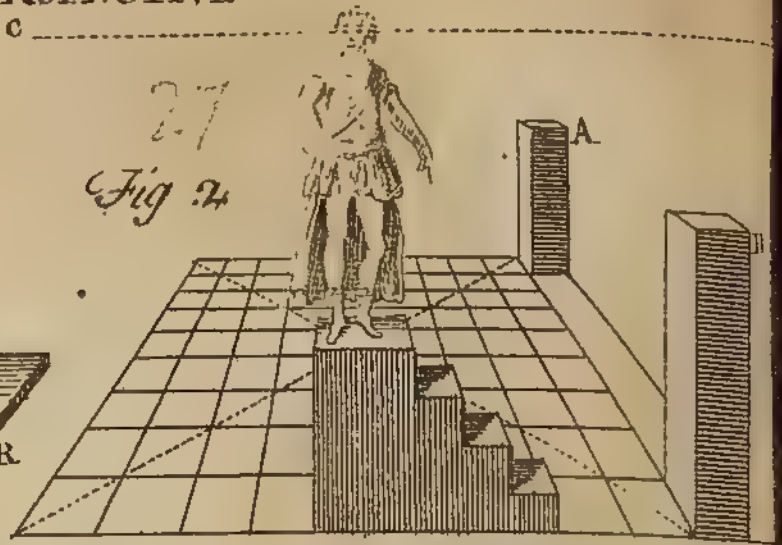
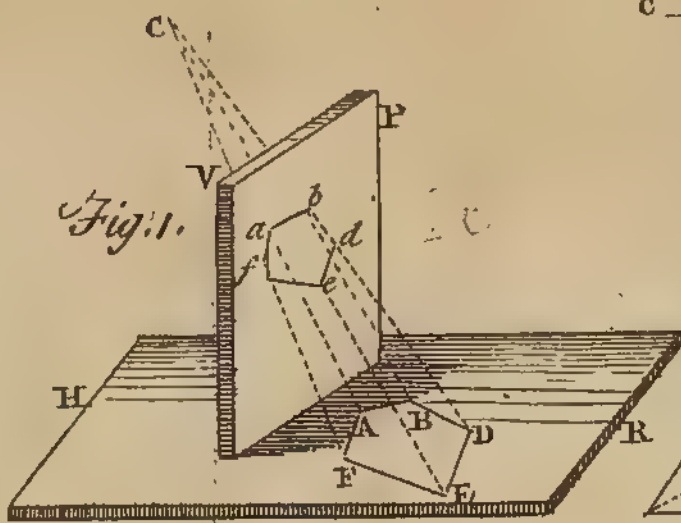


Fig. 9. A Reflecting PERSPECTIVE GLASS

gaping mouths of certain living creatures.

See the article FLOWER.

PERSONIFYING, or **PERSONALIZING**, the giving an inanimate being the figure, sentiments, and language of a person. Personifying is essential to poetry, especially to the epopœia: the poets have therefore personified all the passions, and even represented them as deities; as the goddess Persuasion, the god Sleep; the Furies, Envy, Discord, and Fame, Fortune, Victory, Sin, Death, &c.

PERSPECTIVE, that branch of optics, which teaches how to represent objects on a plane superficies, such as they would appear at a certain distance and height, upon a transparent plane perpendicular to the horizon, placed between the objects and the eye.

The foundation of perspective may be thus conceived: suppose the pentagon *ABDEF* (plate *CXCVIII.* fig. 1.) were to be represented by the rules of perspective on the transparent plane *VP*, placed perpendicularly on the horizontal plane *HR*; dotted lines are imagined to pass from the eye *C* to each point of the pentagon, as *CA*, *CB*, *CD*, &c. which are supposed in their passage through the plane *PV*, to leave their traces or vestigia in the points *a*, *b*, *d*, &c. on the plane, and thereby to delineate the pentagon *abdef*; which, as it strikes the eye by the same rays that the original pentagon *ABDEF* does, will be a true perspective representation of it.

The business of perspective, therefore, is to lay down geometrical rules for finding the points *a*, *b*, *d*, *e*, *f*, upon the plane; and hence, also, we have a mechanical method of delineating any object very accurately. See **DESIGNING**.

Perspective is either employed in representing the ichnographies, or ground-plots of objects; or the scenographies, or representations of the objects themselves. See the article **ICHOGRAPHY** and **SCENOGRAPHY**.

But before we give any examples of either, it will be proper to explain some technical terms in regard to perspective in general: and, first, the horizontal line is that supposed to be drawn parallel to the horizon through the eye of the spectator; or rather it is a line which separates the heaven from the earth, and which limits the sight. Thus, *A*, *B*, (*ibid.* fig. 2.) are two pillars below the horizontal line; *CD*, by reason the line is elevated above them; in fig. 3. they

are said to be equal with it; and in fig. 4. raised above it. Thus, according to the different points in view, the objects will be either higher or lower than the horizontal line. The point of sight, *A* (*ibid.* fig. 5.) is that which makes the central ray on the horizontal line, *ab*; or, it is the point where all the other visual rays, *D*, *D*, unite. The points of distance, *C*, *C*, are points set off in the horizontal line at equal distances on each side of the point of sight, *A*; and, in the same figure, *BB* represents the base line, or fundamental line; *EE* is the abridgement of the square, of which *D*, *D*, are the sides; *F*, *F*, the diagonal lines, which go to the points of distance *C*, *C*. Accidental points, are those where the objects end: these may be cast negligently, because neither drawn to the point of sight, nor to those of distance, but meeting each other in the horizontal line. For example, two pieces of square timber, *G* and *H* (*ibid.* fig. 6.) make the points *I*, *I*, *I*, *I*, on the horizontal line; but go not to the point of sight *K*, nor to the points of distance *C*, *C*: these accidental points serve likewise for casements, doors, windows, tables, chairs, &c. The point of direct view, or of the front, is when we have the object directly before us; in which case, it shews only the fore-side; and, if below the horizon, a little of the top; but nothing of the sides, unless the object be polygonous. The point of oblique view, is when we see an object aside of us, and as it were a-slant, or with the corner of the eye; the eye, however, being all the while opposite to the point of sight; in which case, we see the object laterally, and it presents to us two sides or faces. The practice is the same in the side-points, as in the front-points; a point of sight, points of distance, &c. being laid down in the one as well as in the other.

We shall now give some examples, by which it will appear, that the whole practice of perspective is built upon the foundation already laid down. Thus, to find the perspective appearance of a triangle, *ABC* (*ibid.* fig. 7.) between the eye and the triangle, draw the line *DE*, which is called the fundamental line; from *z* draw *zV*, representing the perpendicular distance of the eye above the fundamental line, be it what it will; and through *V* draw, at right angles to *zV*, *HK* parallel to *DE*: then will

the plane D H K E represent the transparent plane, on which the perspective representation is to be made. Next to find the perspective points of the angles of the triangle, let fall perpendiculars A_1 , C_2 , B_3 from the angles to the fundamental D E : set off these perpendiculars upon the fundamental opposite to the point of distance K, to B, A, C ; from 1, 2, 3, draw lines to the principal point V ; and from the points A, B, and C on the fundamental line, draw the right lines A K, B K, C K, to the point of distance K ; which is so called, because the spectator ought to be so far removed from the figure or painting, as it is distant from the principal point V. The points a , b , and c , where the visual lines V_1 , V_2 , V_3 intersect the lines of distance A K, B K, C K, will be the angular points of the angle $a b c$, the true representation of A B C.

By proceeding in this manner with the angular points of any right-lined figure, whether regular or irregular, it will be very easy to represent it in perspective : however, in practice, several compendious methods will occur to every artist. Again, if the scenographic appearance of any solid were to be represented ; suppose of a triangular prism, whose base is the triangle $m n o$ (*ibid.* fig. 8.) ; you need only find the upper surface of it, in the same manner as you found the lower, or base ; and then joining the corresponding points by right lines, you will have the true representation of the solid in perspective. So that the work is the same as before ; only you take a new fundamental line, as much higher than the former, as in the altitude of that solid whose scenographic representation you would delineate.

But there is still a more commodious way, which is this : having found, as above, the base or ichnographic plane $m n o$, (*ibid.*) let perpendiculars be erected to the fundamental line from the three angular points, which will express the altitude of those points. But because these altitudes, though equal in the body or solid itself, will appear unequal in the scenographic view, the farthest off appearing less than those nearer the eye, their true proportional heights may be thus determined. Any where in the fundamental line, let A B be erected perpendicularly, and equal to the true altitude ; or, if the figure has different altitudes, let them be transferred into the

perpendicular A B ; and from the points A and B, and from all the points of intermediate altitudes, if there be any such, draw right lines to the point of sight V : those lines, A V, B V, will constitute a triangle with A B, within which all the points of altitude will be contained. Through the points o , n , m , draw parallels to the fundamental line ; and from the points a , a , &c. erect perpendiculars to those parallels ; and the points where they intersect the lines A V, B V, as in a , a , b , b , &c. will determine the apparent height of the solid in that scenographic position to the eye in V.

In practice, these parallels and perpendiculars are easily drawn, by means of a good drawing-board or table, fitted for the purpose.

The practical part of perspective, is only the application of these rules to the actual description of objects. But, as this part is purely mathematical, its assistance towards drawing is only what can be performed by rule and compass, and can therefore strictly serve only for finding the images of points, of which they are composed ; and, as these are infinite, it is endless to find them all by the strict rules ; whence it becomes necessary, after a sufficient number of them are found, to complete the image by the help of drawing, to the better effecting of which these points serve as a guide. Thus, when a circle is to be described, the practical rules serve to find a sufficient number of points in the circumference ; which being neatly joined by hand, will perfect the image, so that, in strictness, nothing in this image is found by mathematical rules, save the few particular points ; the rest owes its being to the hand of the drawer. Thus also, if any complicated figure be proposed, it may not be easy to apply the practical rules to the description of every minute part, but by inclosing that figure in a regular one, properly subdivided and reduced into perspective, that will serve as a help, whereby a person, skilled in drawing, may with ease describe the object proposed : upon the whole, where the boundaries of the proposed objects consist of straight lines, and plain surfaces, they may be described directly by the rules of perspective ; but when they are curvilinear, either in their sides or surfaces, the practical rules can only serve for the description of such right-lined cases as may conveniently inclose the objects, and which will enable the designer

to draw them within those known bounds, with a sufficient degree of exactness.

It is therefore in vain to seek, by the practical rules of perspective, to describe all the little hollows and prominencies of objects, the different light and shade of their parts, or their smaller windings and turnings; the infinite variety of the folds in drapery; of the boughs and leaves of trees, or the features and limbs of men and animals; much less to give them that roundness and softness, that force and spirit, that easiness and freedom of posture, that expression and grace which are requisite to a good picture: perspective must content itself with its peculiar province of exhibiting a kind of rough draught to serve as a ground-work, and to ascertain the general proportions and places of the objects, according to their supposed situations, leaving the rest to be finished, beautified, and ornamented by a hand skilful in drawing.

It is true, perspective is of most use where it is most wanted, and where a deviation from its rules would be the most observable; as in describing all regular figures, pieces of architecture, and other objects of that sort, where the particular tendency of the several lines is most remarkable; the rule and compass, in such cases, being much more exact than any description made by hand: but still the figure, described by the perspective rules, will need many helps from drawing; the capitals, and other ornaments of pillars, and their entablatures, the strength of light and shade, the apparent roundness and protuberance of the several parts, must owe their beauty and finishing to the designer's hand: but, with regard to such objects as have no constant and certain determinate shape or size, such as clouds, hills, trees, rivers, uneven grounds, and the like, there is a much larger latitude allowable, provided the general bulk, or usual natural shape of those objects, be in some measure observed, so as not to make them appear unnatural or monstrous. See the article DRAWING. But, although the strict practical rules of perspective are in a great measure confined to the description of right-lined figures, yet the knowledge of the general laws of that science is of great and necessary use to inform the judgment, after what manner the images of any proposed lines should run, which way they should tend, and where terminate; and thereby enables it the better to determine

what appearance any object ought to put on, according to their different situations and distances: it accustoms the eye to judge, with greater certainty, of the relations between real objects and their perspective descriptions, and the hand to draw the same accordingly, and directs the judgment readily to discover any considerable error therein, which might otherwise escape notice. Besides that, when the ground, or general plan, and the principal parts of a picture are first laid down according to the rules, every thing else will more naturally fall in with them, and every remarkable deviation from the just rules will be the more readily perceived, and the easier avoided or rectified; so that although it may be infinitely tedious, or absolutely impracticable, to describe every minute part of a picture, by the strict mechanical rules; yet the employing them, where they can be the most commodiously used, will give the picture in general such a look, as will guide the artist in drawing the other parts without any obvious inconsistency.

We shall, therefore, give such rules as are of most general use in the practice of perspective. 1. Let every line, which in the object, or geometrical figure, is straight, perpendicular or parallel to its base, be so also in its scenographic delineation. 2. Let the lines, which in the object return at right angles from the fore-right side, be drawn scenographically from the visual point. 3. Let all straight lines, which in the object return from the fore-right side, run in a scenographic figure into the horizontal line. 4. Let the object you intend to delineate, standing on your right-hand, be placed also on the right-hand of the visual point; and that on the left-hand, on the left-hand of the same point; and that which is just before, in the middle of it. 5. Let those lines which are (in the object) equidistant to the returning line be drawn in the scenographic figure, from that point found in the horizon. 6. In setting off the altitude of columns, pedestals, and the like, measure the height from the base line upwards, in the front or fore-right side; and a visual ray down that point in the front shall limit the altitude of the column or pillar, all the way behind the fore-right side, or orthographic appearance, even to the visual point. This rule you must observe in all figures, as well where there is a front or fore-right

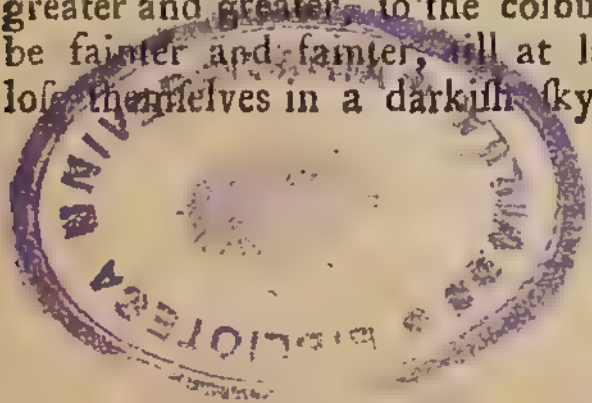
right side, as where there is none. 7. In delineating ovals, circles, arches, crosses, spirals, and cross-arches, or any other figure in the roof of any room, first draw ichnographically, and so with perpendiculars from the most eminent points thereof, carry it up unto the ceiling; from which several points, carry on the figure. 8. The center in any scenographic regular figure is found by drawing lines from opposite angles: for the point where the diagonals cross, is the center. 9. A ground-plane of squares is alike, both above and below the horizontal line; only the more it is distant above or beneath the horizon, the squares will be so much the larger or wider. 10. In drawing a perspective figure, where many lines come together, you may, for the directing of your eye, draw the diagonals in red; the visual lines in black; the perpendiculars in green, or other different colour, from that which you intend the figure shall be of. 11. Having considered the height, distance, and position of the figure, and drawn it accordingly, with side or angle against the base; raise perpendiculars from the several angles, or designed points, from the figure to the base, and transfer the length of each perpendicular, from the place where it touches the base, to the base on the side opposite to the point of distance; so will the diametrals drawn to the perpendiculars in the base, by intersection with the diagonals, drawn to the several transferred distances, give the angles of the figures, and so lines drawn from point to point will circumscribe the scenographic figure. 12. If in a landskip there be any standing-waters, as rivers, ponds, and the like, place the horizontal line level with the farthest sight or appearance of it. 13. If there be any house, or the like, in the picture, consider their position, that you may find from what point in the horizontal lines to draw the front and sides thereof. 14. In describing things at a great distance, observe the proportion, both in magnitude and distance, in draught, which appears from the object to the eye. 15. In colouring and shadowing of every thing, you must do the same in your picture, which you observe with your eye, especially in objects lying near; but, according as the distance grows greater and greater, so the colours must be fainter and fainter, till at last they lose themselves in a darkish sky-colour.

16. The catoptrics are best seen in a common looking-glass, or other polished matter; where, if the glass be exactly flat, the object is exactly like its original; but, if the glass be not flat, the resemblance alters from the original; and that more or less, according as the glass differs from an exact plane. 17. In drawing catoptric figures, the surface of the glass is to be considered, upon which you mean to have the reflection: for which you must make a particular ichnographical draught, or projection; which on the glass must appear to be a plane full of squares, on which projection transfer what shall be drawn on a plane, divided into the same number of like squares; where though the draught may appear very confused, yet the reflection of it on the glass will be very regular, proportional, and regularly composed. 18. The dioptric, or broken beam, may be seen in a tube through a crystal or glass, which hath its surface cut into many others, whereby the rays of the object are broken. For to the flat of the crystal, or water, the rays run straight; but then they break and make an angle, which also by the refracted beams is made and continued on the other side of the same flat. 19. When these faces on a crystal are returned towards a plane placed directly before it, they separate themselves at a good distance on the plane; because they are all directed to various far distant places of the same. See the articles REFLECTION and REFRACTION.

Aerial PERSPECTIVE, is the art of giving a due diminution or degradation to the strength of the light, shade and colours of objects, according to their different distances, the quantity of light which falls on them, and the medium through which they are seen.

As the eye does not judge of the distance of objects entirely by their apparent size, but also by their strength of colours, and distinction of parts; so it is not sufficient to give an object its due apparent bulk according to the rules of stereography, unless at the same time it be expressed with that proper faintness and degradation of colour which the distance requires.

Thus if the figure of a man at a distance, were painted of a proper magnitude for the place, but with too great a distinction of parts, or too strong colours, it would appear to stand forward, and seem proportionally less, so as to represent a dwarf



dwarf situated nearer the eye, and out of the plane on which the painter intended it should stand.

By the original colour of an object is meant that colour which it exhibits to the eye when duly exposed to it in a full open uniform light, at such a moderate distance as to be clearly and distinctly seen. This colour receives an alteration from many causes, the principal of which are the following.

1. From the objects being removed to a greater distance from the eye, whereby the rays of light which it reflects, are less vivid, and the colour becomes more diluted, and tinged, in some measure, by the faint bluish cast, or with the dimness or haziness of the body of air through which the rays pass.

2. From the greater or less degree of light with which the object is enlightened; the same original colour having a different appearance in the shades, from what it has in the light, although at an equal distance from the eye, and so in proportion to the strength of the light or shade.

3. From the colour of the light itself which falls upon it; whether it be from the reflection of coloured light from any adjacent object, or by its passage through a coloured medium; which will exhibit a colour compounded of the original colour of the object, and the other accidental colours which the light brings with it.

4. From the position of the surface of the object, or of its several parts with respect to the eye; such parts of it appearing more lively and distinct than those which are seen obliquely.

5. From the closeness or openness of the place where the object is situated; the light being much more variously directed and reflected within a room, than in the open air.

6. Some original colours naturally reflect light in a greater proportion than others, though equally exposed to the same degrees of it; whereby their degradation at several distances will be different from that of other colours which reflect less light.

From these several causes it happens that the colours of objects are seldom seen pure and unmixed, but generally arrive at the eye broken and softened by each other; and therefore, in painting, where the natural appearances of objects are to be described, all hard or sharp colouring should be carefully avoided.

A painter, therefore, who would succeed in aerial perspective, ought carefully to study the effects which distance, or the different degrees of, or colours of light, have on each particular original colour, to know how its appearance or strength is changed in the several circumstances above mentioned, and represent it accordingly; so that in a picture of various coloured objects, he may be able to give each original colour its own proper diminution or degradation, according to its place.

Now, as all objects in a picture are proportioned to those placed in the front; so in aerial perspective, the strength of light, and the brightness of the colours of objects close to the picture, must serve as a standard, with respect to which, all the same colours at different distances, must have a proportional degradation in like circumstances.

In order, therefore, to give any colour its proper diminution in proportion to its distance, it ought to be known what the appearance of that colour would be, were it close to the picture, regard being had to that degree of light which is chosen as the principal light of the picture. For if any colour should be made too bright for another, or for the general colours employed in the rest of the picture, it will appear too glaring, seem to start out of its place, and throw a flatness and damp upon the rest of the work; or, as the painters express it, the brightness of that colour will kill the rest.

PERSPECTIVE also denotes a kind of painting frequently seen in gardens, at the ends of galleries, &c. expressly designed to deceive the sight.

PERSPECTIVE GLASS, in optics, differs from a telescope in this: instead of the convex eye-glass placed behind the image, to make the rays of each pencil go parallel to the eye, there is placed a concave eye-glass as much before it; which opens the converging rays, and makes them emerge parallel to the eye.

The quantity of objects taken in at one view with this instrument, does not depend upon the breadth of the eye-glass, as in the astronomical telescope, but upon the breadth of the pupil of the eye.

Reflecting perspective-glasses, called by some opera-glasses, or diagonal perspectives, are so contrived, that a person can view any one in a public place, as the opera or play-houses, without it being possible to distinguish who it is he looks

at.

at. A section of it is delineated in plate CXCVIII. fig. 9. where *k a l* is the eye-glass, *i b b* the object-glass, and *d c e* a little speculum or reflecting plane, which is fixed obliquely in a short tube *f g h i*, screwed upon the end of the perspective tube *b i k l*, so that its axis shall make about half a right angle with the speculum. By this means, an object *Q* will be seen by the eye at *a*, in the returning ray *Q c b a*; so that the way to find an object, intended to be viewed by this instrument, is to direct its axis at a right angle to the rays that come from the object; and if the object be higher or lower, it may be found by turning the perspective to and fro about its axis.

If the object be too near to be seen at the perspective end *k a l*, turn the other to the eye; and by looking through the hole *x*, you will see the object *S*, by the ray *S t v x*; coming through the hole *z*, and reflected from another speculum parallel to the former. If the spectator be short-sighted, a concave-glass must be placed in the hole *x*, otherwise a plane one, to make the instrument more like a common perspective.

In both these cases, the speculum neither magnifies nor diminishes the appearance of the object; for if the axis *a c* be produced till *c q = c Q*, the reflected rays will diverge as from an image at *q* equal to the object at *Q*; with this difference only, that the right side of the object will appear on the left-hand, and the left side on the right.

PERSPECTIVE PLANE, is the glass, or other transparent surface, *P V*, (plate CXCVIII. fig. 1.) supposed to be placed between the eye and the object, perpendicular to the horizon. It is sometimes called the section, table, or glass.

PERSPICUITY, *perspicuitas*, in rhetoric, is a principal virtue of style, to which all the ornament and beauties of speech ought to give way. See **STYLE**.

Vossius observes, that a discourse is obscured by too much conciseness and profuseness; several rhetorical figures are likewise destructive of perspicuity.

PERSPIRATION, in medicine, the evacuation of the juices of the body through the pores of the skin. Perspiration is distinguished into sensible and insensible: and here sensible perspiration is the same with sweating, and insensible perspiration, that which escapes the notice of the senses; and this last is the idea affixed to the word perspiration when used alone.

The vessels, through which perspiration is performed, lie obliquely under the scales of the scarf skin, and are so inconceivably small, that from a calculation made by Leewenhoeck, it appears that the mouths of an hundred and twenty-five thousand of them may be covered with a common grain of sand. The matter of insensible perspiration, is a fine subtile fluid which exhales from the body in the form of a vapour, and proceeds from the whole surface and from every cavity: it is of an aqueous and saline nature, and seems to have a great analogy with urine; because in a healthy state, the increase of the one diminishes the other. Many experiments prove its existence. If you pass your finger over the surface of a looking-glass, or any other polished body, it will leave a track of moisture. If you put your naked head near a white wall, exposed to the sun, the shadow of the vapours which proceed from the pores of the skin, may be plainly seen: or if you breathe upon glass, you may perceive it covered with small drops of water; and the vapours which proceed from the lungs, are in winter condensed by the cold, and form a kind of bluish mist, proceeding from the mouth. Other experiments shew that the matter evacuated this way, is at least in some countries more than equal to all the other evacuations by stool, urine, &c. Sanctorius found in Italy, under the circumstances of a moderate diet, middle age, and easy life, that the matter insensibly perspired was five-eighths of that taken in for food; so that there only remained three-eighths for nutrition, and for the excrements of the nose, ears, intestines, bladder, &c. The same author shews, that as much is evacuated by perspiration in one day, as by stool in fourteen days.

But Dr. Bryan Robinson, of Dublin, has found the case very different, both in England and Ireland, and even in South Carolina, in all which places he found that the quantity of urine exceeds that of perspiration, and that if the meat and drink of one day be four pounds and a half, the perspiration of that day will be two pounds, the urine two pounds five ounces, and the stool three ounces.

The matter of sweat is separated from the blood by the miliar glands, and is therefore much more gross than that of insensible perspiration; for as there are no glands which serve for the excretion of

of this last fluid, it is supposed to proceed from the extremities of the capillary arteries.

The use of perspiration is to preserve the suppleness of the papillæ of the skin; to carry the saline particles off from the blood, and by this means to render it more pure; to preserve the body from various diseases, and to contribute to the cure of the most dangerous distempers. It may be promoted by exercise, by dry frictions with a coarse linen-cloth, or a flesh-brush, by warm baths, and washing the hands, feet, head, &c.

PERTH, the capital of the county of the same name in Scotland, thirty miles north of Edinburgh.

PERTHAMBOY, a port-town of New Jersey, in North America: west long. 74° , north lat. $40^{\circ} 45'$.

PERTHOIS, a subdivision of the province of Champaign, in France, situated on the confines of Lorrain.

PERTICATA, in old law-books, is the fourth part of an acre; or a piece of ground containing one perch in breadth, and four in length.

PERU, formerly a powerful empire in South America; but now a province of Spain, is situated between 60° and 81° of west longitude, and between the equator and 25° of south latitude: being near 2000 miles in length from north to south, and from 200 to 500 broad: it is bounded by Popayan, on the north; by the mountains of Andes, on the east; by Chili and La Plata, on the south; and by the Pacific Ocean, on the west.

Balsam of PERU. See **BALSAM**.

PERUGIA, a city of Italy, in the territories of the pope: east long. $13^{\circ} 16'$, north lat. 43° .

PERUVIAN BARK. See **QUINQUINA**.

PES FORESTÆ, the forest foot, an english long measure, containing eighteen inches.

PES MONETÆ, in antient records, signifies a true and reasonable adjustment of the real value of the current coin.

PESADE, or **PESATE**, in the manege, is a horse's raising his fore-quarters, and bending his feet up to his body without stirring his hind-feet.

This motion is the true means to fix his head and haunches, and to hinder him from stamping with his feet.

PESARO, a city of Italy, in the province of Urbino, situated on the gulph of Venice: east long. 14° , north lat. 44° .

PESCARA, a port-town of Italy, in the

kingdom of Naples: east long. $15^{\circ} 25'$, north lat. $42^{\circ} 30'$.

PESCHIERA, a town of Italy, in the territory of Venice, and province of Verona: east longitude 11° , north latitude $45^{\circ} 35'$.

PESSARY, in medicine, a solid substance composed of wool, lint, or linen; mixed with powder, oils, wax, &c. made round and long like a finger, in order to be introduced into the exterior neck of the matrix, for the cure of several disorders incident to the uterus.

This name is also sometimes given to pieces of cork, or other matters thrust up the nostrils, &c. to prevent the entrance of strong infectious steams.

PEST, a city of Upper Hungary, situated on the Danube: east long. $19^{\circ} 15'$, north lat. $47^{\circ} 42'$.

PEST-HOUSE, the same with lazaretto or lazarus-house. See **LAZAR-HOUSE**.

PESTILENCE, in medicine, an epidemical, contagious and malignant disease, popularly known by the name of plague. See the article **PLAGUE**.

PESTILENTIAL FEVERS, such as are attended with some malignant quality, and approach to the nature of the plague. See the articles **BILIOUS-FEVERS**, and **HOSPITAL-FEVER**.

PETAL, among botanists, an appellation given to the flower-leaves, in opposition to the folia, or common leaves of the plant.

According to the number of petals in each flower it is said to be monopetalous, or to consist of a single petal; dipetalous, when it has two; tripetalous, when three, &c. See the article **FLOWER**.

PETALISM, *πεταλισμος*, in antiquity, a kind of banishment practised at Syracuse, by writing the person's name on a leaf, *πεταλον*, whence the name.

It differed only from the ostracism at Athens, as this last was voted by means of shells, *οστρακα*, and lasted ten years; whereas, the petalism was voted by means of leaves, and lasted only five years.

PETARD, in the art of war, a metalline engine, somewhat resembling a high-crowned hat.

The petard may be considered as a piece of ordnance; it is made of copper mixed with brass, or of lead with tin: its charge is from five to six pounds of powder, which reaches to within three fingers-breadth of the mouth; the vacancy is filled with tow, and stopped with a

wooden tampion, the mouth being strongly bound up with cloth tied very tight with ropes. It is covered up with a madrier, or wooden plank, that has a cavity to receive the mouth of the petard, and fastened down with ropes, as represented in plate CXCIV. fig. 5.

Its use is in a clandestine attack to break down gates, bridges, barriers, &c. to which it is hung; and this it does by means of the wooden plank. It is also used in countermines to break through the enemy's galleries, and give their mines vent.

The invention of petards is ascribed to the french Huguenots, in 1579, who with them took Cahors, as D'Aubigné tells us.

PETARDEER, a person who loads, fixes, and fires petards. See the preceding article.

PETASITES, **BUTTERBUR**, in botany, is comprehended by Linnæus among the tussilaginos, or colts-foot. See the article **TUSSILAGO**.

The root of the common butterbur is celebrated for its cordial and alexipharmic virtues; and besides being aperient and detergent, is prescribed in suppressions of urine and the menses; as also in the cough, asthma, and other disorders of the breast.

PETASUS, in antiquity, a covering for the head, with a broad brim, not unlike that of our hats, used on journies to save the face from being sun-burnt.

PETECHIÆ, in medicine, denote spots in the skin like flea-bites, which come out in malignant fevers, hence called petechial, or spotted fevers. See the article **MALIGNANT**.

The more florid the spots are, the less is the danger; and it is a good sign if the black or violet coloured ones become of a brighter colour. The large, black, and livid spots, are almost always attended with profuse bleeding: the small dusky-brown spots, like freckles, are almost as bad as the black and livid ones.

The eruption of the spots is uncertain; sometimes they appear on the fourth or fifth day, sometimes not till the eleventh, or later. The vibices, or large livid, or darkish-green marks, seldom appear till very near the fatal period.

The treatment in all malignant fevers is much the same with that of the hospital-fever. See the article **HOSPITAL-FEVER**.

PETER, or *Epistles of St. Peter*, two canonical books of the New Testament,

written by the apostle St. Peter, and addressed to those jewish converts who were scattered throughout Pontus, Galatia, &c. not only upon the persecution raised at Jerusalem, but upon former dispersions of the Jews into those places. The first of these epistles is principally designed to comfort and confirm them, under those fiery trials they were then subject to; and to direct them how to behave in the several states and relations, both of the civil and the christian life. In the second epistle, the apostle prosecutes the same subject, to prevent their apostacy from the faith, and guard them against the corrupt principles of the gnostics, and those who scoffed at the promise of Christ's coming.

St. PETER'S DAY, a festival of the christian church, observed on the twentieth of June.

PETERBOROUGH, a city of Northamptonshire, situated on the river Nen, thirty-four miles north-east of Northampton: west long. 15', north lat. 52° 53'.

It sends two members to parliament.

PETER-PENCE, an antient tax of a penny on each house, paid to the pope.

It was called peter-pence because collected on the day of St. Peter *ad vincula*, and sent to Rome; whence it was also called Rome-scot and Rome-penny.

PETERSBURG, the capital city of Russia, and one of the largest and most populous cities in the world, situated on both sides the river Nieva, in the provinces of Carrelia and Ingria, between the gulph of Finland and the lake Ladoga: east long. 31°, north lat. 60°. There were no less than sixty-five thousand houses built within three or four years after the foundation was laid, which was in the year 1703.

PETERSFIELD, a borough-town of Hampshire, fifteen miles south-east of Winchester.

It sends two members to parliament.

PETERSHAGEN, a town of Germany, in the circle of Westphalia and dutchy of Minden, thirty-seven miles west of Hanover: subject to Prussia.

PETERWARADIN, a fortified town of Slavonia, situated on the Danube, thirty-five miles north-west of Belgrade.

PETHERTON, a market-town of Somersetshire, 16 miles south-west of Wells.

PETIGLIANO, a town of Italy, in the dutchy of Tuscany: east long. 12° 45', north lat. 42° 45'.

PETIOLE, *petiolum*, in botany, the slender stalk that supports the leaves of a plant.

Some

Some also use the word *petiole* for the middle rib of a leaf; the branches thereof being called *rami*, and the subdivisions of these *furculi*.

PETITGUAVES, a port-town of Hispaniola, situated on a bay at the west end of the island: west long. 76° , north lat. $18^{\circ} 5'$: subject to France.

PETITIO INDUCIARUM, in the civil-law, the same with *imparlance* in common law. See *IMPARLANCE*.

PETITIO PRINCIPII, in logic, the taking a thing for true, and drawing conclusions from it as such; when it is really false, or at least wants to be proved, before any inferences can be deduced from it.

PETITION, a formal supplication or request made by an inferior to a superior, especially to one having some jurisdiction. By statute no person shall procure above twenty hands to a petition to the king or parliament, for any alteration either in church or state, unless by order of three or more justices of the peace, &c. nor shall deliver such petition in the presence of above ten persons, on pain of forfeiting one hundred pounds. 13 Car. II. c. 5.

PETIVERIA, in botany, a genus of the hexandria-tetragynia class of plants, without any flower petals, only the cup being coloured red has much the appearance of such: the seed is single, flattened and emarginated, and armed with the four styles.

PETRE, or **SALT-PETRE**, the same with nitre. See the article *NITRE*.

PETREA, in botany, a genus of the dilynamia-angiospermia class of plants, with a monopetalous flower, divided into five rounded segments at the limb. There is no description of the fruit or seed of this plant.

PETRIDIA, in natural history, a genus of scrupi, of a plane, uniform structure, of no great variety of colours, and emulating the external form of pebbles. See the article *SCRUPI*.

Dr. Hill describes no less than twelve species of this genus. 1. The various-sized, pellucid, colourless, crystalliform petridium, commonly called the pebble-crystal. 2. The purple, semipellucid, crystalline petridium. 3. The snow-white, opaque, crystalline petridium. 4. The opaque, whitish, reddish, or yellowish, crystalline petridium, commonly called red, white, and yellow, sparry pebbles. 5. Yellowish, white, pumicose, or spungy petridium. 6. Hard,

porous, whitish, crystalline petridium.

7. Greyish, white, opaque, stony petridium. 8. Friable, shining, white, arenaceous petridium. 9. White, crystalline petridium, spotted with small yellow dots. 10. Whitish-brown, dull petridium. 11. Bluish, white, hard crystalline petridium. And, 12. Brownish, white, hard, shining petridium.

PETRIFICATION, in physiology, denotes the conversion of wood, bones, and other substances into stone. See the article *STONE*.

The fossil bodies found petrified are principally either of vegetable or animal origin, and are more or less altered from their original state, according to the different substances they have lain buried among in the earth; some of them having suffered very little change, and others being so highly impregnated with crystalline, sparry, pyritical, or other extraneous matter, as to appear mere masses of stone or lumps of the matter of the common pyrites; but they are generally of the external dimensions, and retain more or less of the internal figure of the bodies into the pores of which this matter has made its way.

The animal substances thus found petrified are sea-shells, the teeth, bony palates and bones of fish, the bones of land animals, &c. These are found variously altered, by the insinuation of stony and mineral matter into their pores; and the substance of some of them is now wholly gone, there being only stony, sparry, or other mineral matter remaining in the shape and form. See the articles *FOSSIL*, *Fossil PLANTS*, *SHELLS*, &c.

PETROBRUSSIANS, in church-history, a religious sect which arose in France and the Netherlands, about the year 1126, so called from their leader Peter Bruys. They denied that children, before the use of reason, can be justified by baptism. They also condemned all places of public worship, crosses, crucifixes; and are said to have rejected the sacrament of the eucharist, and prayers for the dead.

PETROLEUM, also called rock-oil, or oil of petre, is an extremely subtle and penetrating fluid, and is by much the thinnest of all the native bitumens. It is very light and very pellucid; but tho' equally bright and clear under all circumstances, it is liable to a very great variety in its colour. It is naturally almost colourless, and in its appearance greatly resembles the most pure oil of turpentine:

this is called white petroleum, though it has no more colour than water; it is sometimes tinged of a brownish, reddish, yellowish, or faint-greenish colour; but its most frequent colour is a mixture of the reddish and blackish, in such a degree that it looks black when viewed behind the light, but purple when placed between the eye and a candle or window. It is of a pungent and acrid taste, and of a very strong and penetrating smell, which very much approaches to that of the distilled oil of amber. The white is most esteemed. It is so very inflammable, that while it floats on the surface of the water, as it does in many parts of Italy, it takes fire at the approach of a candle.

Petroleum is found in rivers, in wells, and trickling down the sides of hills along with little streams of water. In short, it is the most frequent of all the liquid bitumens, and is perhaps the most valuable of them all in medicine. It is to be chosen the purest, lightest, and most pellucid that can be had, such as is of the most penetrating smell and is most inflammable.

It is principally used externally, in paralytic cases, and in pains of the limbs. The French give it internally in hysteric complaints, and to their children against worms; some also give it from ten to fifteen drops in wine, for suppression of the menses. These, however, are rather the practice of the common people than of the faculty.

PETROMYZON, in ichthyology, a genus of the chondropterygious order of fishes, the foramina, or aperture, of whose gills are seven on each side, situated longitudinally; and there is, beside these, one in the middle of the head, between the eyes: the body is long and slender, and nearly cylindric, and is smooth: there are only two fins, both situated on the back of the fish.

To this genus belong the lamprey, and lamprey-eel. See **LAMPREY**.

PETRONEL, a sort of harquebuss, or hand-gun. See **HARQUEBUSS**.

PETROSA OSSA, in anatomy, a name given to the fourth and fifth bones of the cranium, called also ossa temporum, and ossa squamosa; the substance whereof, as their first and last names express, is squamose and very hard. See the article **SKULL**.

Those bones are situated in the lateral and lower part of the head; and are bounded

at top by the squamous suture, which joins them to the parietalia, and behind by the lambdoides, which joins them to the occipital, and connects them to the os spheroides. Each has two sinuses, before and behind the sphenoides: the exterior, which is lined with a cartilage, and receives the process of the lower jaw; the interior receives the lower part of the sinus lateralis of the dura mater: each again has four processes, three of which are external, and one internal: of the external, the first is called the zygomatic, or jugal; the second, the mastoide, or mammillar; the third, the styloide; each of which see under its proper article.

The internal process is properly called the os petrosum; this is pretty long and large, containing the whole meatus auditorius, and cavity of the tympanum. See the article **EAR**.

PETTAW, a city of Germany, in the circle of Austria: east longitude $16^{\circ} 8'$, north latitude 47° .

PETTEIA, *πETTEIA*, in the antient music, the art of making a just discernment of all the manners of ranging or combining sounds among themselves, so as they may produce their effect, that is, express the several passions they are intended to raise: it shews what sounds are to be used, and what not; how often any of them are to be repeated, with which to begin, and with which to end: Petteia, therefore, is in music what manners are in poetry.

PETTIPOLI, a port-town on the coast of Cormandel, in the higher India, where the Dutch have a factory: east long. 80° , north lat. $16^{\circ} 45'$.

PETTREL, in ornithology, a name for the procellaria, or storm-bird. See the article **PROCELLARIA**.

PETWORTH, a town of Sussex, ten miles north-east of Chichester.

PETTY-BAG, an office in chancery, the three clerks of which record the return of all inquisitions out of every county, and make all patents of controllers, gaugers, customers, &c.

PETTY-FOGGER, a little, tricking solicitor or attorney, without either skill or conscience.

PETTY, or **PETIT LARCENY**. See the article **LARCENY**.

PETTY-PATEES, among confectioners, a sort of small pies, made of a rich crust filled with sweet-meats.

PETTY-SINGLES, among falconers, are the toes of a hawk.

PETTY

- PETTY-TALLY**, in the sea-language, a competent allowance of victuals, according to the number of the ship's company.
- PETTY**, or **PETIT-TREASON**. See the article **TREASON**.
- PETUNSE**, in natural-history, one of the two substances whereof the porcelain or china-ware is made. See **PORCELAIN**. The petunse is a coarse kind of flint or pebble, the surface of which is not so smooth, when broken, as that of our common flint. See the article **FLINT**.
- PEUCEDANUM**, **HOG'S FENNEL**, in botany, a genus of the pentandria-digynia class of plants, the general corolla of which is uniform, and each single flower consists of five equal, oblong, crooked and undivided petals; there is no pericarpia; the fruit is oval and compressed. The root of hog's fennel is recommended in the cough and other disorders of the breast, and in obstructions of the viscera.
- PEWTER**, a factitious metal, used in making domestic utensils, as plates, dishes, &c. The basis of this metal is tin, which is converted into pewter, by mixing at the rate of an hundred weight of tin with fifteen pounds of lead and six pounds of brass. See the article **METAL**. Besides this composition, which makes the common pewter, there are other kinds compounded of tin, regulus of antimony, bismuth and copper, in several proportions. Pewter has occasionally served for money. According to Mr. Putland, king James II. turned all the pewter vessels of the protestants in Ireland he could seize, into money; half-crowns were somewhat bigger than half-pence, and other pieces in proportion. This money he ordered to be current in all payments; whence, our author observes, people absconded for fear of being paid their debts; he also mentions crown-pieces of this metal, with the legend on the rim, *melioris tessera fati*.
- PEYBUS**, or **PEPUS**. See **PEPUS**.
- PEZENAS**, a town of Languedoc, in France, thirty miles south-west of Montpellier.
- PEZIZA**, in botany, a genus of mushrooms, of a campanulated figure, with orbiculated convexo-plane seeds. See the article **MUSHROOM**.
- PFALTSBURG**, a town of Lorrain, fifty miles east of Nancy.
- PFRIT**, or **FORETTE**, a town of Upper-Alface, ten miles west of Basil.
- PFORTSHEIM**, a city of Swabia, 28 miles south-west of Hailbron.
- PHACA**, in botany, the same with the astragaloides. See **ASTRAGALOIDES**.
- PHÆNOMENON**, *φαινόμενον*, in philosophy, denotes any remarkable appearance, whether in the heavens or on earth; and whether discovered by observation or experiments.
- PHAGEDÆNA**, *φagedaina*, in surgery, denotes a corroding ulcer. See the article **ULCER**.
- PHAGEDÆNIC MEDICINES**, those used to eat off fungous or proud flesh: such are all the caustics. See **CAUSTIC**. Lime-water has this virtue in so high a degree, that it has got the name of phagedænic-water. See the article **LIME**.
- PHALÆNA**, in the history of insects, a genus of insects, of the order of the lepidoptera; the antennæ whereof are attenuated to the point, not clavated: the species of this genus are very numerous; some of them have the antennæ of a prismatic form; some have them pectinated, or made in fashion of a comb, and of these last, some have no tongue, and others have a spiral one; some have the antennæ pectinated, and fit with the wings flat or plane; others fit with the wings plane and patent, and have simple antennæ and a spiral tongue; some have the antennæ simple, and the tongue spiral, but do not fit with the wings plane, and of these some have the forehead prominent, others not; others again have the antennæ simple, and have no tongue.
- PHALANGIUM**, in zoology, the name of several species of spiders. See the article **SPIDER**.
- PHALANGIUM**, or **ANTHERICUM**, **SPIDER-WORT**, in botany, a genus of the hexandria-monogynia class, the flower of which consists of six very patent, oblong petals; and its fruit is an oval capsule with three cells, containing a great many angulated seeds. Dale says that this plant is good against gripes, and the bites of spiders.
- PHALANX**, in grecian antiquity, a square battalion, consisting of eight thousand men, with their shields joined, and pikes crossing each other; so that it was next to impossible to break it. Some think that the macedonian phalanx had the advantage of the roman legion. See the article **LEGION**.

The

The term phalanx, in anatomy, signifies three rows of small bones in the fingers. See the article FINGERS.

PHALARIS, in botany, a genus of the triandria-digynia class of plants, with a bivalve corolla, and only a single seed contained in the corolla.

PHALEUCIAN VERSE, in antient poetry, a kind of verse which consists of five feet, the first of which is a spondee, the second a dactyl, and the three last trochees; such is the following one of Martial,

1 2 3 4 5

Summam nec metu as diem, nec optes.

PHALLUS, in botany, a genus of mushrooms, with a small umbilicated and perforated head. See MUSHROOM.

PHANATIC, a term of reproach formerly given to the dissenters, from a false supposition that they pretended to visions, &c.

PHANTASM, *φαντασμα*, a term sometimes used in a synonymous sense with idea, or the notion retained in the mind of an external object. See IDEA.

PHANTASTIC STYLE, in music, denotes a free and easy manner of composition, proper for instruments.

The peripatetics gave the colours of the rainbow the appellation of phantastic, as supposing them to be only phantoms or deceptions of the sight; but Sir Isaac Newton has demonstrated the contrary. See the article COLOUR.

PHANTASY, or FANCY, the same with imagination. See IMAGINATION.

PHARISEES, a famous sect of the Jews, who distinguished themselves by their zeal for the traditions of the elders, which they derived from the same fountain with the written word itself; pretending that both were delivered to Moses from Mount Sinai, and were therefore both of equal authority. From their rigorous observance of these traditions, they looked upon themselves as more holy than other men, and therefore separated themselves from those whom they thought sinners or prophane, so as not to eat or drink with them; and hence, from the hebrew word *pharis*, which signifies to separate, they had the name of pharisees, or separatists.

Their pretences to extraordinary piety, drew after them the common people, who held them in the highest esteem and veneration. They held a resurrection from the dead, and the existence of angels and spirits; but, according to Josephus, this was no more than a py-

thagorean resurrection, that is, of the soul only, by its transmigration into another body, and being born anew with it. From this resurrection they excluded all who were notoriously wicked, being of opinion, that the souls of such persons were transmitted into a state of everlasting woe: but as to lesser crimes, they imagined they were punished in the bodies which the souls of those who committed them were next sent into.

According to this notion it was, that Christ's disciples asked him, concerning the blind man, "Who did sin, this man or his parents, that he was born blind?" With the essenes, they held absolute predestination; and with the sadducees, free-will: but how they reconciled these seemingly incompatible doctrines, is no where sufficiently explained.

PHARMACY, the art or science which teaches the election, preparation, and mixture of medicines; constituting one part of the therapeutic branch of medicine, the objects of which are all natural bodies. See MATERIA MEDICA. As to the choice of simple drugs, of which medicines are prepared, regard must be had to the places of their growth, the climate, the season when they are most in perfection, and the like.

The preparation of them consists, 1. In washing and freeing them from gross and useless parts. 2. Herbs, flowers, fruits, and roots must be dried. 3. Filings of steel must be moistened with rain-water. 4. Some drugs must be infused in liquors, in order to dissolve them, as ceruse in vinegar; and others boiled to soften them, as the roots of althæa. 5. Some things, again, are to be sawed, or cut; others chopped, rasped, or filed; and, finally, others bruised or broken, as roots and dried fruits.

The mixture of medicines consists in blending and uniting them together, to make compositions. To perform this properly, we must learn to distinguish those ingredients which unite together naturally, from those which will not mix but by the assistance of art. Oil, for instance, mixes very well with fat substances; but will not unite, unless imperfectly, with water. The spirit of salt seems to mix tolerably well with spirit of wine; but their union will be rendered more intimate by digesting them together, for some days, in a sand-heat, and then distilling them. We should

should likewise know the method of mixing several drugs, whether by pounding them in a mortar, dissolving, boiling, &c. The order of mixing drugs must likewise be observed: thus pulps ought to be mixed before powders, odoriferous ingredients should be mixed last, &c. Many other remarks might be made, relating to the composition of medicines; but they will come in more properly among the directions for making each particular sort, as they will be much better comprehended when the operations themselves are examined.

Some divide pharmacy into two parts, the galenic and chemical. See the articles **GALENIC** and **CHEMISTRY**.

PHARNACEUM, in botany, a genus of the pentandria-trigynia class of plants, without any corolla; but the calyx resembles one, being coloured on the inside, and its edges thin; the fruit is an oval capsule, obscurely trigonal, and in part covered by the cup; it consists of three cells, in which are contained numerous nitid, orbiculated, and depressed seeds, surrounded with a margin.

PHAROS, a small island in the Mediterranean sea opposite to Alexandria, in Egypt.

PHAROS, or **PHARE**, a **LIGHT-HOUSE**, a pile raised near a port, where fire is kept burning, in the night, to guide and direct vessels near at hand. The pharos of Alexandria, built in the island of Pharos, at the mouth of the Nile, was antiently very famous, inasmuch as to communicate its name to all the rest. This most magnificent tower consisted of several stories and galleries, with a lantern at top, which being continually burning, might be seen for many leagues at sea, and along the coast.

PHARSALUS, a town of antient Thessaly, situated in european Turkey, a little south of Larissa, in east long. 23° , and north lat. 39° .

PHARYNX, in anatomy, the upper part of the oesophagus. See **OESOPHAGUS**. The muscles of the pharynx serve to open or shut the oesophagus: these are in number three pair, viz. the stylopharyngæus, the pterygopharyngæus, and the oesophagæus. See the article **STYLOPHARYNGÆUS**, &c.

There are a number of glands situated in the pharynx; and excretory oscula, or openings, are frequently discovered with them.

PHASACUM, in botany, a genus of the

cryptogamia-musci class of plants, without any calyptra or apophysis.

PHASEOLUS, **KIDNEY-BEAN**, in botany, a genus of the diadelphia-decandria class of plants, the corolla whereof is papilionaceous; the vexillum is cordated, obtuse, emarginated and reclined with reflex sides; the alæ are roundish, of the same length with the vexillum, and stand upon long unguis; the carina is narrow, and revolves spirally in a contrary direction to the sun; the fruit is a long, straight, coriaceous, and obtuse pod; the seeds are oblong, compressed, and kidney-shaped.

PHASES, *φασεῖς*, in astronomy, the several appearances or quantities of illumination of the moon, venus, mercury, and the other planets; or the several manners wherein they appear illuminated by the sun. See the articles **MOON**, **MERCURY**, **VENUS**, &c.

PHASIANUS, the **PHEASANT**, in ornithology. See **PHEASANT**.

PHASMATA, in physiology, certain appearances arising from the various tinctures of the clouds, by the rays of the heavenly luminaries, especially the sun and moon. These are infinitely diversified by the different figures and situation of the clouds, and the appulses of the rays of light.

PHASSACHATES, in natural history, the name of a species of agate, which the antients, in its different appearances, sometimes called also leucachates and perileucos. See the article **AGATE**.

The same agate, from the various proportion or manner of admixture of its particles in different specimens, often makes a very different figure; but no species is so liable to remarkable diversities of this kind as this. It is but of a small variety of colours, yet is often very beautiful: its ground or basis is always a pale, bluish grey, approaching to what we call a lead-colour or dove-colour. Sometimes it is equally and evenly of this colour, thro' the whole mass: but often also it is variegated within with veins of a deep black, and of a pure and clear white; these sometimes approach the surface of the stone, but more usually they are only near the center; and they are almost always disposed in concentrical, but irregular circles, round one, two, or more points. The pieces of this stone, cut where there are many of these veins, much resemble parts of onyxes.

It is found in the East Indies, and in Bohemia,

Bohemia, and some other parts of Europe. When the whole matter of the veins and basis of this stone are blended together into one equal mass, as is frequently the case both with this and many other of the naturally veined stones, the whole becomes of a deeper greyish blue, or a dove-colour, and is then the phassachates; when the veins are kept distinct and clear, it is the leucachates and perileucos, agreeing with all the descriptions of the antients.

PHEASANT, *phasianus*, in ornithology, a genus of birds of the order of the gallinæ, with the space about the eyes naked, and no wattles.

The common pheasant would be very common in our woods, if it were not so universally the delight of the sportsman and of the table. There are two other species, *viz.* the scarlet-breasted pheasant, nearly of the size of the common kind; and the long-tailed, horned, and elegantly variegated pheasant of the East Indies: this last is covered all over with a profusion of the brightest colours, yellow, red, white, bluish-green, and almost every tinge; it has also two callous substances, like horns, of a fine blue colour, above the eyes; and on each side hangs a loose skin, of the same colour, with spots of an orange colour. See plate CXCVII. fig. 4.

Pheasants, on being imported from christmas to midsummer, pay a duty of 15 s. 4 $\frac{8}{10}$ d. the dozen, and draw back on exportation 13 s. 6 d. and pheasant-pouts, from midsummer to christmas, pay on importation 9 s. 7 $\frac{1}{2}$ d. the dozen, and draw back on exportation 8 s. 5 $\frac{1}{4}$ d.

PHEASANTS-ISLE, a little island in the river Bidassoa, which divides France and Spain, situated in west longit. 1° 20', and north lat. 43° 20'.

PELLANDRIUM, **WATER-HEMLOCK**, in botany, a genus of the pentandria-digynia class of plants, the general corolla whereof is nearly uniform; the single flowers are unequal, they are composed each of five acuminate cordato-inflex petals; the fruit is naked, smooth, and coronated with the perianthium and pistils; it is separable into two parts: the seeds are two, oval and smooth.

PELYPÆA, in botany, a genus of the didynamia-angiospermia class of plants, the corolla whereof consists of a single ringent petal; the tube is very short and roundish; the faux is oblong, and the limb patent on both sides; the fruit is a

roundish, acuminate, compressed capsule, containing one cell, and made up of two valves; the seeds are numerous and oblong.

PHENICIA, or **PHOENICIA**, a subdivision or province of Syria, situated on the Levant, or eastern part of the Mediterranean sea, on the confines of Palestine.

PHEONS, in heraldry, the barbed heads of darts, arrows, or other weapons, and usually represented as in plate CC. fig. 4.

PHIAL, a small thin glass-bottle, vulgarly called a vial.

PHIDITIA, in grecian antiquity, feasts celebrated with great frugality at Lacedæmon. The phiditia were held in the public places, and in the open air: rich and poor assisted at them alike, and on the same footing; their design being to keep up peace, friendship, and a good understanding and equality among all the citizens, great and small. It is said, that they who attended this feast, brought each a bushel of flour, eight measures of wine named chorus, five minæ of cheese, and as much figs.

PHILADELPHIA, the capital of the province of Pensilvania, in North America, situated on the rivers Delawar and Schoolkill: west long. 74°, north lat. 40° 50'.

PHILADELPHIA is also the name of an antient town of the lesser Asia, situated in east long. 29°, north lat. 38°.

PHILAUTIA, in the schools, signifies self-love, or a vicious fondness and complaisance for a man's self.

PHILADELPHUS, or **SYRINGA**, in botany, a genus of the icosandria-tetragynia class of plants, the flower of which consists of four large, patent, roundish, and emarginated petals; the fruit is an oval capsule, pointed at each end, and containing four cells, in which are lodged numerous oblong and small seeds.

PHILIP-FORT, a fortress in dutch Brabant, situated on the east side of the Scheld, opposite to Pearl-fort five miles north-west of Antwerp.

PHILIPS-NORTON, a market-town of Somersetshire, situated five miles south of Bath.

PHILIPPI, an antient town of Macedonia, a province of european Turkey, situated in east long. 25°, north lat. 41°.

PHILIPPICS, *φιλιππικοι λογοι*, in literature, a name given to the orations of Demosthenes against Philip king of Macedon; being esteemed the master pieces of that great orator.

Philippic

Philippic, is also a term applied to the fourteen orations of Cicero against Mark Anthony.

PHILIPPINE ISLANDS are situated in the Pacific ocean, in Asia, between 114° and 131° east longitude, and between 5° and 19° north latitude: there are a great number of them, and some very large. See **LUCONIA**, **MENDANAO**, &c.

PHILIPPINES, a religious society of young women, at Rome; so called from their taking St. Philip de Neri for their protector: they consist of an hundred poor girls, who are brought up till they are of age to be married, or become nuns, under the direction of some religious women, who teach them to read, write, and work; and instruct them in the duties of christianity. They wear a white veil, and a black cross on their breasts.

PHILIPPOPOLI, a city of european Turkey, in the province of Romania, situated on the river Mariza, in east long. 25° , and north lat. $42^{\circ} 20'$.

PHILIPSBURGH, a city of Germany, in the palatinate of the Rhine, situated on the east bank of the river Rhine, in east long. $8^{\circ} 16'$, north lat. $49^{\circ} 8'$.

PHILIPSTAT, a town of Sweden, in the province of Gothland and territory Wermeland, situated in east long. 14° , north lat. $59^{\circ} 50'$.

PHILIPVILLE, a town of the french Netherlands, in the province of Hainalt, twenty-two miles south-west of Namur.

PHILIZER, or **PHILAZER**. See the article **FILAZER**.

PHILLYREA, or **PHYLLYREA**, in botany, a genus of the diandria-monogynia class of plants, the corolla whereof consists of a single petal, divided into four short segments at the limb; the fruit is a globose berry, with only one cell, in which is a single large seed, of the same shape.

The leaves and bark of this shrub are said to be astringent and good in ulcers of the mouth; but they are little regarded in the present practice.

PHILOLOGY, *φιλολογία*, a science or rather assemblage of several sciences, consisting of grammar, rhetoric, poetry, antiquities, history, and criticism.

Phylology is a kind of universal literature, conversant about all the sciences, their rise, progress, authors, &c. It makes what the French call the *belles lettres*. In the universities it is called humanities. Antiently, philology was only a part of grammar.

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PHILOMATHES, a lover of learning or science.

PHILONIUM, in pharmacy, a kind of somniferous anodyne opiate, taking its name from Philo the inventor.

There are two kinds of philonium, the persian and the roman, the first of which is prepared thus: take of white-pepper and white-henbane, each ten drams; of opium, terra-sigillata, each five drams; lapis hæmatitis, saffron, each two drams and an half; castor, indian-spikenard, pyrethrum, pearls, amber, zedoary, doricum, or else elecampane, troches of ramich, each half a dram; camphor, a scruple; honey of roses, fifteen ounces: mix them together for an opiate. The roots, the seeds, the castor, the saffron, and the troches of ramich, are to be reduced to a powder together; and the blood-stone, the pearls, and the amber, are to be levigated on a marble till they are reduced to an impalpable powder; and the sealed earth, and the camphire, are to be pounded together. This preparation is proper for stopping hæmorrhages and fluxes, as also for preventing abortions: the dose of it is from one scruple to one dram.

The philonium romanum is thus prepared: take of white-pepper and white-henbane-seeds, each five drams; opium, two drams and a half; cassia-bark, one dram and a half; smallage-seed, one dram; and the seeds of macedonian-parsley, fennel, and candy-carrots, each two scruples five grains; saffron, one scruple and a half; spikenard, pellitory of Spain, and zedoary, each fifteen grains; cinnamon, a dram and a half; myrrh and castor, each a dram; syrup of white poppies, a sufficient quantity to make the whole into an electuary. This is a powerful opiate, and given from ten grains to two scruples, to ease violent pains and procure sleep.

PHILOSOPHER, *φιλοσοφος*, a person versed in philosophy; or one who makes profession of, or applies himself to, the study of nature and morality. See the article **PHILOSOPHY**.

PHILOSOPHER'S STONE, the greatest object of alchymy, is a long sought for preparation, which, when found, is to convert all the true mercurial part of metal into pure gold, better than any that is dug out of the mines, or perfected by the refiner's art; and this only by casting a little quantity thereof upon metals in fusion, whilst that part of the metal

which was not mercury is immediately burnt or blown away. This stone is said to be equal in weight to gold, brittle like glass, of a deep red colour, and melting like wax by the fire. Alchemists have not only promised this, but promised also to make the like stone for silver, which shall convert all metals, except gold and silver, into the finest silver. They have further, says Boerhaave, promised to perfect the philosopher's stone to such a degree, that being projected upon any quantity of gold melted by the fire, it may convert the whole substance into philosopher's stone; and, to exalt the same still farther, that being projected upon pure quicksilver, it shall convert the whole into philosopher's stone. See the article *TRANSMUTATION of metals*.

All required is, say the alchemists, to do that by art which nature does in many years and ages; for as gold and lead do but differ little in weight, therefore there is not much in lead besides mercury and gold. Now if any body could be found which would so agitate all the parts of lead, as to burn all that is not mercury therein, having also sulphur to fix the mercury, would not the mass remaining be converted into gold? Such is the foundation for the opinion of the philosopher's stone, which alchymists contend to be a most fixt, concentrated fire, which, as soon as it melts with any metal, does, by a magnetic virtue, immediately unite itself to the mercurial body of the metal, volatilizes and cleanses off all that is impure therein, and leaves nothing but a mass of pure gold.

There are two other ways whereby alchemists have attempted to arrive at the making of gold: the first is by separation; for it is affirmed, that every metal yet known contains some quantity of gold, only in most the quantity is so small that it will not defray the expence of getting it out.

The second is by maturation, for the alchemists hold mercury to be the basis and matter of all metals; that quicksilver, purged from all heterogeneous bodies, would be much heavier, denser and simpler than the native quicksilver; and that by subtilizing, purifying, and digesting it, with much labour and long operations, it may be converted into pure gold. See the article *GOLD*.

PHILOSOPHER'S TREE. See the article *DIANÆ ARBOR*.

PHILOSOPHIC, or *PHILOSOPHICAL*,

something that relates to philosophy. See *PHILOSOPHY* and *PHILOSOPHER*.

PHILOSOPHIC CHEMISTRY. See the article *CHEMISTRY*.

PHILOSOPHICAL EGG, among chemists, a thin glass-body, or bubble, of the shape of an egg, with a long neck or stem, used in digestions.

PHILOSOPHY, φιλοσοφία, the knowledge or study of nature and morality, founded on reason and experience.

Philosophy, among the antients, was used in various senses; for, 1. It sometimes was taken for universal knowledge, viz. of all things human and divine. 2. In a stricter notion, for the contemplation of nature only; and in this sense a philosopher was called by Plato φιλοσοφῶν της φύσεως, i. e. a friend and lover of nature. 3. Sometimes for ethics, or the doctrine of manners, which we call moral philosophy. 4. It included also the mathematical arts and discipline, especially arithmetic and geometry. 5. The doctrine of existence, or *being* in the abstract, called metaphysics. 6. For the knowledge τῆς πρώτης καλῆς, i. e. of the prime or chief good, viz. God; and this was their prima philosophia, or theology. 7. It was sometimes applied to logics or dialectics, which gave rules for reasoning about the nature of things. See the articles *KNOWLEDGE*, *PHYSIOLOGY*, and *THEOLOGY*.

Philosophy may be divided into three parts, intellectual, moral, and physical. The intellectual part comprizes logics and metaphysics; the moral part contains the laws of nature and nations; and, lastly, the physical part comprehends the doctrine of bodies animate or inanimate. These with their various subdivisions, will take in the whole of philosophy. See the articles *LOGIC*, *METAPHYSICS*, *ETHICS*, *POLITICS*, &c.

Wolffius makes the three parts of philosophy to be the doctrine of God, the human soul, and of bodies: however, when he subdivides, and comes to treat of the several branches separately, his divisions readily come under the three heads, intellectual, moral, and physical, before-mentioned.

For the method of philosophizing, or the rules for that purpose, as established by Sir Isaac Newton, see the article *EXPERIMENTAL PHILOSOPHY*.

From the first broachers of new opinions, and the first founders of schools, philosophy is become divided into innumerable sects,

sects, some antient, others modern; such are the platonists, peripatetics, epicureans, stoics, pyrrhonians, and academics; and such are the cartesians, newtonians, &c. See the rise and doctrines of each sect under its proper head, PLATONIC, PERIPATETIC, EPICUREAN, STOICS, PYRRHONIANS, ACADEMICS, CARTESIANS, NEWTONIAN, &c.

The causes of errors in antient philosophy, or the reason why all former philosophers have, through so many ages, erred, may, as delivered by lord Bacon and Mr. Locke, be seen under the article ERROR.

PHILTER, or FILTER, in pharmacy. See the article FILTER.

PHILTER, or PHILTRE, *φίλτρον*, is more particularly used for a love-potion, or medicine to excite love.

PHILTRATION, or FILTRATION. See the article CLARIFICATION.

PHILYCA, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of a single, imperforated, erect petal, rude upon the outside; the tube is of a conic form, and of the length of the perianthium; and the limb is quinquesid, erect, and small; the fruit consists of a roundish, trilobous, trilocular, and trivalvar capsule; and the seed is single, roundish, gibbous on one side, and angulated on the other.

PHIMOSIS, in medicine, a disorder of the penis, in which the prepuce is rendered so strict or tense, that it cannot be drawn back over the glans.

The general cause of a phimosis is, by physicians, rightly ascribed to impure coition; for while the virulent matter, which had been lodged in the sinuses of the vagina, continues between the skin and glans, the prepuce, especially if it be long or tight, can hardly escape being swelled with an inflammation, and a phimosis must be induced. Some, however, have the foreskin naturally so long, and so straight, that the glans can either be not at all or very little uncovered; but as this neither occasions trouble in discharging the urine, nor any impediment in procreation, it requires no aid from the surgeon, unless it be attended with inflammation, violent pain, or any remarkable inconvenience in coition. See the article GONORRHOEA.

If this disorder is occasioned by no venereal taint, it may be sufficient to bathe the penis, for some time, in warm water: but if it proceed from a venereal infection, proper internal medicines must

be administered, and the other symptoms mitigated by washing out the virulent matter with a decoction of barley, mixed with honey of roses, which must be frequently injected with a syringe between the skin and the glans. To discuss the tumour, apply externally an emollient and digestive fomentation round the tumefied part of the penis; and if the inflammation be severe, bleeding should not be omitted. But if, after this, the prepuce cannot be drawn back, let the end of it be pulled as far forwards as possible, while an assistant holds the covered glans with his fingers; then let the surgeon, with his left thumb, press back the glans, covered with the skin, and with a knife, or scissars, extirpate all that part of the prepuce which projects beyond his thumb, much in the same manner with the jewish circumcision; after which, the skin may be easily drawn back, and the glans being uncovered, may be more expeditiously cleansed and healed. Another method is, to divide with a pair of probe-scissars so much of the prepuce as will suffice to denude the glans; and after this longitudinal incision, some surgeons cut off, with the scissars, so much of the end of the prepuce as appears superfluous. These operations are usually attended with a pretty plentiful hæmorrhage, which should not be stopped by art, but rather permitted, according to the patient's strength, in order to abate the inflammation: dress the wound with dry lint, and apply a proper compress and bandage; and proceed afterwards as in the cure of other wounds, taking care not to heal it too hastily, nor too closely, lest there should be occasion to repeat the operation.

PHLEBOTOMY, in surgery, the opening a vein with a proper sharp-edged and pointed instrument of steel, in order to let out a proper quantity of blood, either for the preservation or recovery of a person's health. See DISEASE.

Phlebotomy, or bleeding, appears to be not only one of the most useful, but one of the most antient operations in surgery, and is frequently performed in different parts of the body, as the foot, the forehead, temples, neck, tongue, penis, and other parts, yet is most generally performed in that vein of the inside of the arm, which lies near the joint of the cubit, and therefore we shall begin with shewing the method of opening this vein. See VEIN. The surgeon having tied on a fillet, about a hand's breadth above the bend of the

cubit; and the veins being compressed and enlarged, by the blood's being stopped in its return, he is to examine which vein lies fairest, and is therefore most proper to be opened. In the arm are three principal veins; the first or uppermost of which is called the cephalic vein, the undermost the basilic vein, and that in the middle the median. And here it is to be observed, that the median and basilic veins, as they are larger than the cephalic, discharge a greater quantity of blood, but are attended with more danger in the operation; for a considerable artery and the brachial nerve lie under the basilic vein, and the tendon of the biceps-muscle under the median; but as they lie fairer to the eye, it is safer for the unexperienced surgeon to open the cephalic, or at least the median vein; but sometimes the veins are so situated as to deprive him of all choice. When the veins are not risen, it will be proper to rub the arm below the bandage, to drive up the blood, and render the veins more turgid; while this is doing, the surgeon should lay his thumb on the vein he intends to open, to prevent the blood from flowing back, and to keep the vein from rolling; and then holding the lancet, so that the thumb and first finger may be fixed about the middle of the blade, the other fingers should rest gently upon the patient's arm, to prevent his hand from slipping. The lancet is now to be pushed slightly and carefully forward by the thumb and the fore-finger, till it has penetrated thro' the coats of the vein, and at that instant to be raised a little upwards in order to enlarge the orifice of the wound, and give a freer passage to the blood. When there seems to be a sufficient quantity of blood discharged, the ligature must be immediately taken off, from above the elbow, and the skin about the orifice must be gently pressed together by which means the lips of the divided vein are easily closed, and the little blood that may remain between the orifice and the vein discharged: one or two compresses are then put on, which the surgeon presses gently on the orifice with his left thumb, till the bandage is laid across it, which is afterwards fastened by turning it round the arm, both above and below the elbow, and tying both together.

In bleeding in the foot, it must be observed, that the veins proper for this operation, are the saphena and cephalica, the last of which extends itself from the in-

ternal angle to the great toe; and the first, from the external malleolus to the smaller toes: bleeding in each of which is attended with the same effect: but if the veins upon the metatarsus, or instep, do not fully appear, it may be convenient to open one of those at the angle, or about the calf or ham of the leg, where the phlebotomist is not so liable to injure any of the tendons, as in the metatarsus. For the more easy apertion of these veins, the patient must first wash both feet in warm water; and the surgeon having fixed upon the particular foot and vein, which appears most turgid, he applies a ligature about two fingers-breadth, above the angle, or where he intends to open the vein, and puts it in the warm water again, while he takes out his lancet. Then kneeling down on one knee, he takes out the foot, and, it being wiped dry, places it on the other knee, or upon a board laid over the vessel of warm water, and, securing the vein from slipping with the thumb of his left hand, makes the orifice; but if the patient does not bleed freely, puts the foot again in the warm water, till he judges, by its colour, and the strength of the patient, that a sufficient quantity of blood has been drawn; the orifice is then to be closed by the thumbs, and, after drying the foot with a napkin, to be secured by compresses and a bandage. In bleeding in the jugular veins of the neck, a stricture must be made round the lower part of the neck, with a neck-cloth or handkerchief, or the common ligature, to make the vein turgid or conspicuous, and then either of the jugular veins being secured by the thumb, the incision must be made, and, the requisite quantity of blood being taken away, the ligature must be removed, and the orifice compressed with the thumb, if the blood does not stop without, while the neck is wiped clean, after which the compress and circular bandage must be applied. It is to be observed, that if the disorder lies in the whole head, or in the neck and fauces, the orifice may be made either in the right or left side indifferently; but when only one side of the head, or one eye is affected, the vein ought to be opened on that side in which the disorder lies. In bleeding in the veins of the forehead, temples, and occiput, a stricture must be made round the neck, and the same method used as in opening the jugular veins; only observing that the patient must

must hold down his head, to prevent the blood trickling into his eyes, &c.

In bleeding in the veins called *ranulæ* under the tongue, a stricture must be made round the neck, as before; you then elevate the apex of the tongue with your left hand, while with the lancet in your right hand, you circumspectly open first one, and then the other on each side; because the aperture of one only will hardly ever discharge blood enough to give any considerable relief. When you judge that a sufficient quantity of blood has run out of the mouth into the vessel, remove the ligature from the neck, upon which the flux usually stops of itself; but if it should still continue, let the patient take a little vinegar or frontinac wine in his mouth, and hold it there till the hæmorrhage ceases, which cannot be dangerous, even without such topics. In bleeding in the *vena dorsalis penis*, which runs along the upper side of the penis, and is generally pretty much distended, and conspicuous in an inflammation of this part, it is to be observed that it must be opened about the middle, and kept bleeding till the member becomes flaccid, and a sufficient quantity of blood is discharged; which done, you must apply a compress, and the bandage proper for the penis. But you must carefully endeavour to avoid injuring the arteries or nerves, which enter the penis near this vein; as also not to make your bandage too strict; for by this means, the inflammation and symptoms may turn out worse than before.

In bleeding in the eyes, there are several ways of performing the operation, but the best, in Heister's opinion, is the following. The patient being seated on a chair, and his head held in a proper posture, a transverse incision is to be made, with a fine lancet, upon the turgid small veins in the corners of the eye, so as to open them or cut them quite asunder. The eye-lids must be held apart with one hand, whilst the veins are opened with the other; and some use a pair of fine scissars for this purpose, instead of a lancet, and others elevate the veins with a crooked needle before they divide them; but in this operation the better way would be to make the needles with edges, that when the veins were thus elevated, they might divide them without the help of any other instrument. When the incision is made, the discharge of blood must be promoted by means of fomentation,

with a sponge dipped in warm water; and if the discharge is not sufficient, the incision may be repeated two or three times: but few patients can be brought to suffer this, and there is no practising it at all upon infants, because they will not keep the eye steady.

For the use of leeches in bleeding, see the article *LEECH*.

PHLEGM, φλεγμα, in the animal oeconomy, one of the four humours whereof the antients supposed the blood to be composed. See the article *BLOOD*.

The chemists make phlegm, or water, an elementary body, the characters of which are fluidity, insipidity, and volatility: and yet quicksilver has all these, which nobody pretends to be phlegm. See the article *WATER*.

The phlegm of vitriol, Mr. Boyle observes, is an effectual remedy against burns, and excellent for dissolving hard tumours: that of vinegar will extract a saccharine sweetness from lead, and even dissolve corals by long digestion: that of sugar of lead is said to dissolve pearls. Phlegm, or an insipid water, always comes out first in distillations; however, it is doubted, whether even repeated distillations can obtain it perfectly free from all other mixtures, or altogether devoid of smell and taste.

PHLEGMAGOGUES, in pharmacy, such medicines as purge off phlegm: such are hermodactyls, agaric, turbith, jalap, &c. See the article *HYDRAGOGUES*.

PHLEGMATIC, among physicians, an appellation given to that temperament, or habit of the body, wherein phlegm is predominant; which gives rise to catarrhs, coughs, &c. See the articles *CATARRH* and *COUGH*.

PHLEGMON, in surgery, denotes an external inflammation and tumour, attended with a burning heat, &c. See the article *INFLAMMATION*.

PHLEUM, in botany, a genus of the triandria-digynia class of plants, the corolla of which consists of two valves; and the seed, which is single, is included within the calyx and corolla.

PHLOGIDIAUGIA, a class of fossils, the characters of which are, that the bodies comprehended in it are transparent and inflammable: such are sulphur, orpiment, zarnich, and amber. See the articles *SULPHUR*, *ORPIMENT*, &c.

PHLOGISCIERIA, another class of fossils, which are inflammable bodies of a coarser and more impure texture, and not

not pellucid : such are ambergrease, jet, asphalta, ampelites, and lithanthrax. See AMBERGREASE, JET, &c.

PHLOGONIÆ, a class of compound, inflammable, and metallic fossils, found in small masses of determinately angular figures; comprehending the pyricubia, pyroctogonia, and pyripolygonia.

PHLOGOSIS, a small inflammation of the eye. See the article OPTHALMIA.

PHLOMIS, SAGE-MULLEIN, in botany, a genus of the didynamia-gymnospermia class of plants, the flower of which is monopetalous and ringent, and its four triquetrous seeds are contained in the bottom of the cup. Its leaves are accounted astringent and vulnerary.

PHLOX, in botany, a genus of the pentandria-monogynia class of plants, the corolla whereof consists of a single hypocrateriform petal; the tube is cylindric and three times the length of the cup, narrow below, and crooked; the limb is plain, and divided into five roundish, equal, obtuse segments, shorter than the tube: the fruit is an oval, but somewhat trigonal capsule, formed of three valves, and containing three cells: the seeds are single and oval.

PHLYACOGRAPHIA, among the antients, a merry and burlesque imitation of some grave and serious piece, particularly a tragedy travestied into a comedy; being the same with the hilarody or hilarotragedy.

PHLYCTÆNÆ, in medicine, small eruptions on the skin, arising from an hot or acrimonious humour. Hippocrates sometimes represents them as resembling those pustles which appear after ambustions.

PHLYSTÆNA, in medicine, a disease which produces buboes or tumours full of a ferous humour.

PHLYZATION, in medicine, a pustle or inflammation of the skin, or the blister arising from being burnt or scalded with hot liquor.

PHOCA, the SEA-CALF, in zoology, a genus of quadrupeds of the order of the feræ: the fore-teeth in the upper jaw are six, those in the under jaw are only four: the feet have each five toes, and are palmed, and made for swimming: there are no ears.

This is a very singular and extraordinary animal, as seeming in some degree to connect the quadruped and the fish-kind: the common phoca grows to five feet or more in length: the whole body is covered with a fur, of a mixed

greyish and yellowish colour; the creature is contrived for living a great part of its time under water: the foramen ovale of the heart being to this purpose continued open in it, as it is in a foetus, which is to live without the assistance of breathing.

PHOCEA, a city of Oeolis, on the west coast of the lesser Asia, antiently so called. Phoea, or Phocis, was also a subdivision of Achaia, in the ancient Greece, now a part of Livadia in european Turkey.

PHOENICOPTERUS, or FLAMINGO, in ornithology, a genus of birds, of the order of the anseres, of which there is only one known species; its beak is bent in such a manner as to appear broken, and is dentated at the edges. It is one of the most singular birds in the world, with an extremely long neck, and still longer legs, in proportion to the size of its body: the covering feathers of its wings are all of the highest scarlet, and make a most glowing appearance; whence the name. See plate CXCIX. fig. 2.

PHOENIGMUS, in pharmacy, a medicine which produces redness with blisters on the part to which it is applied. Such are mustard-seed, pepper, vesicatories, &c. These medicines are used to draw the humours to the part they are applied to, and to divert it from the part affected.

PHOENIX, in astronomy, one of the constellations of the southern hemisphere, unknown to the antients, and invisible in our northern parts. This constellation is said to consist of thirteen stars. It took its name from that of a bird famous among the antients, but generally looked upon by the moderns as fabulous. The antients speak of this bird as single, or the only one of its kind: they describe it as of the size of an eagle; its head finely crested with a beautiful plumage, its neck covered with feathers of a gold colour, and the rest of its body purple, only the tail white, and the eyes sparkling like stars; they hold that it lives five or six hundred years in the wilderness; that when thus advanced in age, it builds itself a pile of sweet wood and aromatic gums, and fires it with the wafting of its wings, and thus burns itself; and that from its ashes arises a worm, which in time grows up to be a phoenix.

PHOENIX, the GREAT PALM, or DATE-TREE, in botany, a genus of plants, the characters of which are not yet perfectly ascertained: the male and female flowers are

Fig. 1. PICA



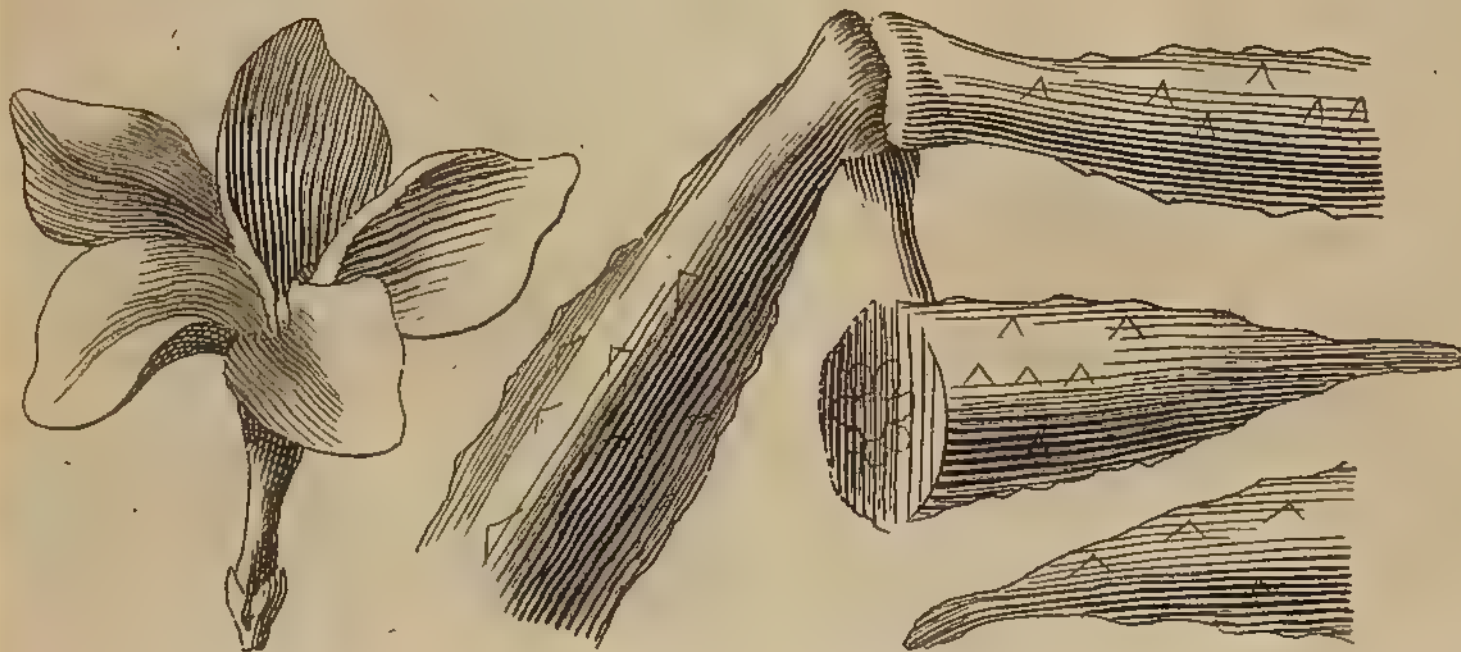
Fig. 2. PHOENICOPTERUS or FLAMINGO.



Fig. 3. PLATANUS, the PLANE-TREE.



Fig. 5. PLUMERIA.



are on distinct plants, or on the same spadix. In the male flowers the general spatha is composite; the spadix is ramose; the corolla is deeply divided into three hollow oval segments; the stamina are three slender filaments. In the female flowers the calyx is the same as in the male; the corolla is divided into three principal segments, with as many very small laciniae: the fruit is an oval berry, having only one cell, and in that a single osseous seed, of a sub-oval figure, with a longitudinal furrow.

PHOLAS, a shell-fish of the multivalve-kind, composed of five pieces, three of which are very small, so that they seem to a superficial observer to be made up of only two shells.

The animal inhabiting the pholas is called tethys. They inhabit holes made in stones and other solid bodies, as corals, the bottoms of ships, &c. whence all shell-fish living in this manner have been commonly called pholades, since there are muscles and chamæ found lodged in the same manner.

PHOLIS, in natural history, a name given to the gypsums of a bright appearance.

PHONICS, φωνική, the doctrine or science of sounds, otherwise called acoustics. See the article **SOUND**.

Phonics may be considered as analogous to optics, and divided like that into direct, refracted, and reflected, as phonics, diaphonics, and cataphonics.

As to the object of phonics, sound may be improved both with regard to the begetting, as in speaking, whistling, singing, hollowing, &c. and with regard to its propagation by the position of the sonorous body.

With regard to the medium, phonics may be improved by the thinness and quiescency thereof, and by the sonorous body being placed near a smooth wall, either plane or arched, especially cycloidal or elliptical; whence the theory of whispering places: as also by placing the sonorous body near water, its sound is mollified; and, on a plain, the sound is conveyed to a greater distance than on uneven ground, &c.

As to the ear, it is helped by placing it near a wall, especially at one end of an arch, the sound beginning at the other, or near the surface of water or the earth; and by instruments, as the stentorophonic or speaking-trumpet; also by an instrument to help weak ears, by an instrument to take in vastly remote sounds,

by a microphone, and by a pholyphone. Cataphonics may be improved by several kinds of artificial echos. See the article **HEARING**.

PHORBÆA, or **PHORBEIA**, in the music of the antients, a name given to a sort of frenum or bandage applied to the mouths of people who played on the pipe; being a sort of leather band which went across the forehead, then behind each ear, and then, making one or two turns round the head, it passed over the mouth, where its office was to restrain the lips from emitting too much breath at once, and cause them to discharge only just as much as would serve to inflate the pipe.

PHOSPHORUS, in physiology, a denomination given to all bodies which shine and seem to burn, without having any degree of heat.

That these bodies owe their lucidity to the motion of the parts, seems evident for the following reasons: 1. Several phosphori are undoubtedly owing to putrefaction, as rotten wood, very stale meat, especially veal, some sorts of fish long kept, as oysters, lobsters, flounders, whittings, &c. which putrefaction is the effect of a slow and gentle fermentation, or intestine motion of the parts. 2. Most phosphori have their light so weak as to shine only in the dark, which seems to argue a lesser degree of velocity in the parts, than what is necessary to produce heat; because this last degree of velocity will cause bodies to shine in open day-light. 3. Some phosphori are the parts of animated bodies, as the cindela or glow-worm; but all the parts of an animal are undoubtedly in motion. 4. Other phosphori put on the appearance of flame, as the ignis fatuus, the writing of common phosphorus made from urine, flashes of lightening, &c. but all flame is nothing but a kindled vapour, whose parts are all in motion, which may be too weak to cause burning, or even a sensible degree of heat. 5. Several of those innocent lambent flames may have their matter so agitated, or the velocity of their motion so increased, as actually to produce heat, and burn: thus, the writing of phosphorus on blue paper, sufficiently rubbed, will kindle into an ardent flame, and burn the paper. 6. Phosphori seem to have the essential nature of fire, because they are so easily susceptible of a burning quality from fire: thus, common phosphorus is immediately kindled into a most ardent

ardent and inextinguishable flame, by common fire. 7. By stroking the back of a black horse, or cat, in the dark, we produce innumerable scintillæ, or lucid sparks; in the same manner, the rubbing a piece of black cloth, which has hung in the sun to dry, will cause it to throw out the particles of light which it had imbibed from the sun; whereas, a white piece of cloth, which reflects most of the sun's rays, emits no such lucid sparks in the dark.

Many other reasons might be urged to shew, that light of every kind is owing to one and the same cause in a greater or lesser degree, *viz.* the velocity of the parts of the lucid body.

Phosphori in general, says Lemerî, may be considered as so many sponges full of the matter of light, which is so slightly retained therein, that a small external force is sufficient to put it in motion, and cause it to exhale in a lucid form: thus the phosphori made of human urine, and other chemical preparations, receive so large a proportion of fire in their preparation, and retain it so well in their unctuous substance, that it may be kept there, in water, for twenty years; so as upon the first laying them open to the air, they shall take fire, and exhale in lucid flames. Not that the fire is supposed to be fixed and quiescent all the while in the body of the phosphorus; for that it has a real motion all the time is evident hence, that it is seen in any dark place, in the summer-season, fulminating and emitting flashes (though, with all this, it scarce loses any thing of the fire) so that the fire is not fixed in the phosphorus, but in a continual undulatory motion.

Chemistry, says Dr. Shaw, hath scarce afforded any thing more surprising than the common phosphorus. To see letters traced with this matter become luminous in the dark, images and the bodies of men to blaze with light, and abundance of the like experiments, performed by means of phosphorus, must awaken the curiosity of those who have seen these experiments, and render them desirous of being acquainted with the method of preparing it. The preparation, even to this day, is kept as a secret in few hands, and the matter sold at a very great price. Whence we apprehend it would be no unacceptable present to the world, to render this commodity cheaper, and discover its farther uses,

The successful method of preparing the phosphorus of urine is this: evaporate any quantity of fresh urine over a gentle fire, to a black and almost dry substance; then, with two pounds thereof, thoroughly mix twice its weight of fine sand; put this mixture into a strong-coated stone long-neck; and having poured a quart or two of clear water into a large receiver, join it to the long-neck, and work it in a naked fire: let the heat be small for the first two hours; then increase it gradually to the utmost violence: and continue this for three or four hours successively: at the expiration of which time, there will pass into the receiver a little phlegm and volatile salt, much black and foetid oil, and, lastly, the matter of phosphorus, in form of white clouds, which either stick to the sides of the receiver, like a fine yellow skin, or fall to the bottom in form of small sand. Now let the fire go out, but let the receiver continue till all be cold, lest the phosphorus take fire on the admission of the air. To reduce these small grains into one piece, put them into a little tin ingot-mould, with water; heat the ingot to make the grains melt together; then add cold water, till the matter is congealed into one solid stick, like beeswax; which being cut into small pieces, fit to enter the mouth of a vial, may be preserved by water, and keeping the glass close stopped. If the glass were not to be stopped, the phosphorus would turn black on its surface, and at length be spoiled.

The cautions required to make this process succeed, are, 1. To evaporate the urine, while it is recent. 2. To prevent its boiling over, and by that means losing the most unctuous part. 3. To let the matter afterwards ferment in the cold. 4. To mix the black matter with the sand, to prevent its melting and running over. 5. To use a stone long-neck, those of earth being too porous, and suffering the phosphorus to transude sooner, than pass into the receiver. 6. To have the receiver very large, and with a very long neck, to prevent its breaking and over-heating, which would either evaporate the white vapour wherein the phosphorus consists, or else prevent its coagulating. 7. To put water into the receiver, for keeping it cool, and quenching the phosphorus, as it falls to the bottom. 8. To make the fire small at first, that the long neck may be preserved,

served, and the black matter gradually dried; which would otherwise swell, and run over in a black froth. 9. Lastly, it is found necessary, that the urine for the operation be of such as drink malt-liquors, rather than wine. All these circumstances being required for obtaining the phosphorus to advantage, it is no wonder that so many of those who attempted it, miscarried.

This operation may be greatly shortened, by freezing and concentrating fresh urine; afterwards evaporating it with care; then digesting it in the manner above-mentioned. When thoroughly digested, commit the matter, in a large quantity, to an iron-pot, with an earthen head, as the chemists usually do for making spirit of hartshorn, or the spirit and salt of urine: and when, by this method, all the salt and oil are obtained, let the caput mortuum be taken out, and mixed with twice its own weight of alum. The matter may now be put into well-coated long-necks, and worked with care in a reverberatory furnace, into very large receivers filled with water, and connected to the long-necks by adopters, the lower ends whereof may enter the water, as in distilling of quick-silver; the operation being continued eight or ten hours. And this is apprehended to be the best way, hitherto known, of procuring phosphorus to advantage.

This phosphorus has been several ways disguised, so as to make it appear under various forms; sometimes as a solid, sometimes as a liquid, sometimes as an ointment, and sometimes as a running mercury.

Dr. Wall informs us, that Mr. Boyle, being concerned to find how small a proportion of phosphorus was afforded by urine, desired him to look out for another subject that might afford it in greater plenty. The doctor afterwards causing a piece of dry matter to be dug up in the fields where night-men emptied their carts, he observed a great number of small particles of phosphorus therein. This matter the doctor immediately carried to Mr. Boyle, who set Bilgar, the chemist, to work upon it; but he could obtain very little phosphorus from it, till another material was added to it in distillation; and then he procured phosphorus in such plenty, that, selling large quantities at six guineas the ounce, he soon became rich, and left England.

The matter which thus fixes and in-

creases the phosphorus is apprehended to be alum; which is itself not only in some measure prepared from urine, but appears to afford the same kind of acid that phosphorus yields by burning; for, upon its analysis, phosphorus appears to be a composition of a strong acid and inflammable matter, exactly in the manner of common brimstone, whence it may not improperly be called an animal sulphur: and accordingly, like common brimstone, it will burn under a glass-bell, and afford flowers that become an acid liquor, like oleum sulphuris per campanam, by attracting the moisture of the air.

This phosphorus has been employed for making curious experiments, a few whereof we shall here exhibit, from Dr. Shaw. 1. The light of this phosphorus appears greater in vacuo than in the open air. 2. In hot weather it is observed to dart flashes of light through the water wherein it is contained, so as exactly to resemble lightning; which thus darts unextinguished through watery clouds and vapours. 3. These flashes of light are not apt to kindle or burn any combustible matter, in which they resemble the harmless kind of lightening; but in a condensed state this phosphorus burns very furiously, and with a most penetrating fire, so as to melt and dissolve metals: in which respect it again resembles the more destructive kinds of lightening, which are found to have the same effects. 4. If a little piece of this phosphorus be viewed through a microscope, the internal parts appear in a constant ebullition. 5. Though this phosphorus appears to be a kind of sulphur, yet it does not dissolve in highly rectified spirit of wine, but communicates some sulphureous parts thereto; for, if this spirit be poured into water in the dark, it yields a faint degree of light. 6. This phosphorus, being mixed with a large quantity of pomatum, makes a shining unguent, which may be rubbed on the hands and face, without danger of burning, so as to render them luminous in the dark.

Many other surprising experiments may be made with this phosphorus, which is a substance that seems in chemistry to be much such a thing as the loadstone in natural philosophy; and its effects almost as odd and difficult to explain, for want of knowing the latent properties of bodies

There are other different kinds of artificial phosphori, of which we shall only mention two, discovered by Mr. Homberg. The first is that usually called the black phosphorus, now commonly prepared with alum and wheat flour (five parts of the former to one of the latter) calcined together to a brownish or blackish mass; which being powdered and set in a phial loosely stopped, in a sand-heat, so as to continue glowing for some time; then removing the whole from the fire, and suffering it to cool gradually, and at last stopping the bottle close, it should be kept in a dark and dry place. A little of this powder being exposed to the open air, immediately takes fire, and appears like a glowing coal; and it is remarkable, that it may be made of any animal or vegetable substance, instead of wheat flour; but that no salt can be substituted instead of alum.

Mr. Homberg's other phosphorus is made of one part of sal ammoniac, and two parts of lime, flaked in the air; mix these well together, and fill a small crucible with them; set this in a small fire of fusion, and as soon as the crucible is red hot, the mixture will melt, and should be stirred with an iron rod to prevent its running over. When the matter is entirely fused, pour it into a brass-mortar, and when cool it will appear of a grey colour, and as if vitrified; if now it be struck upon with any hard body, it appears as on fire in the whole extent of the stroke; but the matter being brittle, it is proper for the experiment's sake, to dip little bars of iron or copper into the melted matter in the crucible; for thus they will be enamelled as it were with the matter, and these bars being struck upon will give the same fire, and the experiment may be several times repeated before all the matter falls off. These bars must be kept in a dry place, to prevent the phosphorus upon them from running, by the moisture of the air.

Both these phosphori were discovered by accident; the first, in searching for a limpid oil from the common stercoraceous matter that should fix quicksilver; and the second, by endeavouring to calcine sal ammoniac with lime, so as to render it fusible like wax; which end was obtained, but not the other.

PHOTINIANS, a sect of christians in the fourth century, so called from Photinus, their chief, who was bishop of Sirmich,

and maintained that Jesus Christ was true man, but not true God, nor born before all ages; and that he only began to be Christ when the Holy Spirit descended upon him in the river Jordan. These doctrines were condemned in several assemblies, and particularly by the Arians, in a synod held at Sirmich in the year 351.

PHRASE, *φρασις*, in grammar, a manner of speech peculiarly adapted to certain occasions, arts, languages, &c.

Sometimes the term phrase is used for a short sentence. See **SENTENCE**.

PHRASEOLOGY, in matters of literature, a collection of the phrases, and elegant expressions, in any language.

PHRENES, *φρενες*, in anatomy, the name by which Hippocrates, and the ancient physicians, called the diaphragm, as supposing it to be the seat of the rational soul. See the article **DIAPHRAGM**.

PHRENETIC VESSELS, in anatomy, the nerves, arteries, and veins which are spread over the diaphragm. The phrenetic nerves arise from the cervical ones; the phrenetic arteries arise out of the descending aorta, and are distributed thro' the diaphragm and pericardium; and the two phrenetic veins discharge their contents into the vena cava.

PHRENITIS, or **PHRENSY**, in medicine. See the next article.

PHRENSY, *φρενιτις*, in medicine, an inflammation of the membranes of the brain, attended with an acute fever and delirium.

A primary phrensy is preceded by heat, and a violent inflammatory pain within the head, a redness of the eyes and face, unquiet and troubled sleep, a slight degree of folly, watching, sadness, fierceness, sudden forgetfulness, and a gathering of threads from the bed-cloaths; whereas a symptomatic phrensy succeeds any acute disease, but is worst when preceded by an inflammation of the pleura, lungs, or diaphragm.

A black tongue, an obstinate costiveness, white faeces (which is always a fatal sign) a wildness in the looks and actions, &c. are signs of an approaching phrensy; which is generally fatal on the third, fourth, or seventh day, which last it seldom exceeds: when it does, and is violent, the patient becomes raving mad; and it often terminates in a lethargy, coma, or catoche.

This disease, says Arbuthnot, requires the speediest applications of all others; profuse

profuse hæmorrhages of the nose often resolve it; and copious bleeding in the temporal arteries, is the most efficacious remedy. The diet should be water-gruel, acidulated; and the drink barley-water, small-beer, or the decoction of tamarinds.

According to Boerhaave, varices of the veins, or the bleeding-piles, are beneficial: a looseness is likewise good; and a violent cough, or hæmorrhage, often put an end to the disease. He therefore advises plentiful bleeding, through a large orifice, or to open several veins at the same time, as the jugular, frontal, and a vein in the foot.

Hoffman, from experience, prefers bleeding at the nose, procured by thrusting up a straw, a pen, or a skewer. But if this disease proceeds from a suppression of the lochia or menses, speedy and copious bleeding in the foot is necessary: and if from a stoppage of the bleeding piles, leeches must be applied to the hæmorrhoidal veins. After bleeding, cathartics are proper; among which, the following is preferable to all others: take of manna, four ounces; of cream of tartar, two drams; of nitre, half a dram; of oil of sweet almonds, an ounce: all which are to be taken in a pound of whey. The drink also should be fresh whey. Emulsions of the four cold seeds with barley-water, adding to every quart two scruples of nitre, are also convenient.

Externally, warm baths are proper for the feet; or linen-cloths may be dipped in hot-water, and applied to the feet. But especially let the head be shaved all over, and embrocated with a mixture of the best vinegar, two ounces; camphorated spirit of wine, two drams; purified nitre, two scruples; and oil of rhodium-wood, twenty drops. Antiphlogistic clysters are also proper.

But if all these means fail, recourse must be had to cupping in the lower parts; to opiates and mild blisters: though Hoffman thinks the two latter hurtful; and Boerhaave advises the physician to consider well, if the case be symptomatic, how far the foregoing method, or any part of it, is consistent with the primary disease.

PHRYGANEÆ, in zoology, a genus of insects of the order of the neuroptera, the palate whereof is prominent, with two tentacula on each side; the wings

are incumbent; and the worm of it lives under water in a kind of case.

PHRYGIA, the Greater and Lesser, two provinces antiently of Asia Minor; having the Hellespont on the north.

PHTHIRIASIS, φθιριασις, in medicine, the pedicularis morbus, or lousy disease, is most incident to children, though adults are not wholly exempt from it. Cleanness and wholesome food are best for preventing this disorder, which may be cured by washing the body with a lixivium of wormwood, staves-acre, lesser centaury, and oak-ashes; adding some common salt. All the bitters, sour and salt things, are here recommended; as is also mercury, which infallibly destroys these vermin; but it ought to be used with great caution, even by adults, and should never be used in applications to children.

Etmuller advises the head to be washed with a lixivium, in which has been boiled the seeds of staves-acre, and afterwards anointed with a liniment made of two drams of oil of spike, half an ounce of the oil of bitter-almonds, and six drams of the oil of tobacco, which will destroy those animals in one night's time. The powder of indian-berries, sprinkled on the head, also effectually destroys them. Black soap is an infallible remedy for destroying crab-lice lodged in the groins of adults.

PHTHISIS, φθισις, a species of consumption, arising from an ulcer of the lungs. See the article CONSUMPTION.

The sign of an approaching phthisis, according to Morton, is a dry cough, which may continue for some months; whereas a simple catarrh is attended with spitting, and is but of short duration. Vomiting, or a disposition to vomit after eating, excited by the above-mentioned cough, is a most certain sign of a phthisis.

The effects of an ulcer of the lungs already formed, but concealed under the name of a vomica, are chiefly these;—a purulent consumption of the whole lungs, or one of its lobes; a continual dry cough; the bursting of the vomica; the sometimes suffocating discharge of the pus, or the daily coughing up of matter, which sinks in water, and is thick, foetid, white, red, yellow, livid, or streaked; and which, put into the fire, has the smell of burnt flesh. Sometimes the vomica breaks into the cavity of the

thorax, which is what physicians call an empyema. See EMPYEMA.

If the purulent matter is allowed to enter the blood, the respiration becomes exceeding bad; the chyle, and the whole mass of blood, are converted into pus; the usual method of nourishment is destroyed; the solids continually waste away; a hectic fever appears, with nocturnal sweats, swelling of the feet and hands, and diarrhoea of purulent cadaverous stools, which generally end in death.

As to the cure, Boerhaave's method is this: when a vomica is known to be formed in the lungs, the physician must endeavour to ripen it, which is done by a milk diet, riding on horse-back, warm vapours, and expectorant medicines. The blood must be defended against the purulent infection, by moderately acid and saltish remedies, vulnerary herbs, and balsamics, given in various forms, in great plenty, and continued a long time. The ulcer must be cleansed and healed by liquid medicines, and such things as promote coughing, by motion, riding, and good air. The cleansers are detergent balsamics, used inwardly and outwardly; and the consolidaters are pectorals. The aliment should be easy of digestion; butter-milk is excellent; as are also asses-milk, ptisans, broths and lactinia.

Sydenham advises, at first, bleeding and gentle purging, to diminish the defluxion on the lungs; then pectorals, and such medicines as temperate the hectic fever, with emulsions, and asses-milk. See the article HECTIC.

And, lastly, he directs the ulcer to be healed with balsamics, as opobalsamum, the dose being twenty drops upon sugar; but this is not to be taken before due evacuations have been first made: but, above all, he recommends riding; which, he says, as certainly cures a consumption, as the peruvian bark does intermitting fevers.

But as consumptions are so common as to make above a tenth part of the bills of mortality in London, we shall give Morton's method of treating them. In the first stage, when the person is afflicted with a continual cough, especially in the night time, the defluxion upon the lungs is to be stopped by bleeding, by repeated draughts of oxymel of squills and oil of sweet-almonds, of each an ounce, to be taken in large draughts of posset-drink;

after which an opiate, made of two ounces of the simple alexiterial water, half an ounce of simple cinnamon-water, and six drams of the syrup of poppies will be proper; or the patient may take six or ten of the storax-pills. It will also be convenient to carry down the impurities by stool, with a gentle cathartic. Diaphoretics likewise are not to be neglected; nor must those remedies that soften, lubricate, thicken, and concoct the phlegm be omitted; as sugar-candy, barley-sugar, old conserve of roses, liquorice-juice, the white and black troches of the London-dispensatory, fresh-butter in water-gruel, sweet-oil, oil of sweet-almonds, and especially linseed-oil cold drawn, of which the patient may take a spoonful every hour, unless there is a diarrhoea, or other symptom that forbids it. He may also eat raisins and figs, and use the other medicines commonly prescribed for coughs. See the article COUGH.

In the second stage, when the vomica is formed, but not suppurated, evacuations of all kinds are pernicious. The patient should continue the use of the pectoral medicines, and especially the balsamic pills, milk-diet, and the chalybeate-waters; of which he should drink only four, or at most six pints in a day, and a little at a time: and this course should be continued for several years.

But whether a milk-diet be used alone, or mixed with mineral-waters, Hoffman thinks it highly necessary to attend to the following particulars: 1. We ought diligently to enquire whether the strength of the stomach is sufficient to digest and again expel this species of medicine. 2. It is expedient that, before the use of the milk, the primæ viæ should be well cleansed from viscid and acid humours; which intention is most effectually answered by a laxative infusion of manna, whose virtue is augmented by adding a sufficient quantity of tartar. 3. On the first days, it is expedient every morning about six or seven, and every afternoon, about five o'clock, to drink six or eight ounces of women's or asses-milk, and afterwards gradually to increase the quantity. 4. After the patient has for six or eight days drank the milk in this manner, a gentle laxative medicine, and such as has a tendency to evacuate the fordes, is to be interposed and repeated every sixth day. 5. He ought never to use wine or malt-liquors for drink, but rather

rather ptisans of barley, hartshorn, and citron-peel. He must also carefully abstain from aliments of hard digestion, and such as generate bad juices. On the contrary, broth prepared of tortoises, cray-fish, veal, fowls, lettuce, and garden succory, are of singular service. 6. In order to augment the concoctive force of the stomach, which in a phthisis is very languid, it is expedient between meals to exhibit some balsamic pectoral, and stomachic elixir, such as that made of the best myrrh, saffron, nutmegs, orange-peel, marsh-trefoil, and liquorice-root.

As to the pectoral and vulnerary balsams, the forms recommended by the most celebrated physicians are, according to the same author, the following ones.

Take of the oil of St. John's wort, two ounces; of sperma-ceti, six drachms; of the best venice-turpentine, three drachms; of dragon's-blood, one drachm; and of laudanum-opiatum, six grains: mix all together, and let the dose be from one to two drachms.

Nor, says he, have I found the following balsam less efficacious: take of the oil of sweet-almonds, two ounces; and of the flowers of sulphur, sublimed by quicklime, two drachms: boil over a gentle fire; then add, of the balsam-capivi, one drachm; of sperma-ceti and beeswax, each half an ounce; of the extract of saffron, half a drachm; and of the oils of anise, fennel, and mace, each ten drops.

Another balsam for answering the same end may be prepared thus: take, of the best prussian honey and mountain diacodium, each one ounce; of the aqueous essence of myrrh inspissated, half an ounce; of the flowers of sulphur, and the extract of the tops of yarrow, each two drachms; of the extract of saffron, half a drachm; and, of the oils of mace and saffra-wood, each eight drops.

These noble and efficacious balsams, when their use is indicated, cannot be exhibited in a better or more proper vehicle, than a sufficient quantity of the milk of asses, goats, or cows.

In colliquative sweats, Morton recommends the free use of pearl-julep; to which may be added chalk, coral, dragon's blood, or other absorbents: the patient should not be allowed to sleep too long, and the bed-clothes should be lighter,

As for symptomatic consumptions, arising from a gonorrhœa, the fluor-albus, a diarrhœa, &c. the method of cure will be found under the articles GONORRHŒA, FLUOR-ALBUS, &c.

PHYGETHLON, in surgery, a broad, but not much elevated tumour, of the same nature with the bubo. See the article BUBO.

PHYLACTERY, in antiquity, a charm, or amulet, which being worn, was supposed to preserve people from certain evils, diseases, and dangers. See the article AMULET.

The Jews were remarkable for wearing phylacteries of parchment, in the form of slips or rolls, wherein were written certain passages of the law: these they wore upon their foreheads, and upon the wrists of their left arms. The modern Jews think themselves under no obligation to this practice, which they observe only at morning prayers.

PHYLLANTHUS, in botany, a genus of the monoecia-triandria class of plants, without any flower petals; the calyx is monophyllous, campanulated, and divided into six parts: the fruit is a roundish capsule, with three cells, in each of which is a single seed.

PHYLLIS, in botany, a genus of the pentandria-digynia class of plants, the corolla of which consists of five lanceolated and obtuse petals, just cohering at their bases: the fruit is of a turbinatoblong, obtuse, and angular figure, composed of two parallel seeds.

PHYLLONA, in botany, a genus of mosses, consisting only of a thin membranaceous matter, resembling in some degree a leaf; whence the name. See the article MOSS.

PHYMA, in surgery, any kind of tumour. See the article TUMOUR.

PHYSALIS, or **ALKEKENGİ**, in botany. See the article ALKEKENGİ.

PHYSETER, in ichthyology, the name of a genus of fishes of the order of the plagiuri, having teeth only in the lower jaw that are crooked; on the back there is a fin, of a large and tall spine; and the opening or fistula for the discharge of the water is in the front part of the head. See the article PLAGIURI.

This genus comprehends the crooked-toothed whale, and the plane-toothed whale. See the article WHALE.

PHYSETER is also a species of balæna, or whale, with the fistula in the middle of the head, and a pinniform tuberosity on the

the back: it is equal in length to the greenland-whale, but not a third of its thickness.

PHYSIC, φυσική, the same with medicine. See the article **MEDICINE**.

PHYSICAL, something relating to nature. See the articles **NATURE** and **NATURAL PHILOSOPHY**.

PHYSICIAN, a person who professes medicine, or the art of healing diseases. See **MEDICINE** and **DISEASE**.

For an account of the college of physicians in London, see the article **COLLEGE**.

PHYSICS, a denomination sometimes given to natural philosophy. See the article **NATURAL PHILOSOPHY**.

PHYSIOGNOMONICS, among physicians, denote such signs as being taken from the countenance, serve to indicate the state, disposition, &c. both of the body and mind: and hence the art of reducing these signs to practice is termed physiognomy, than which nothing can be more precarious, in so far as it respects the characters of people accustomed by education and practice to dissemble their sentiments.

PHYSIOLOGY, properly denotes a discourse of nature, and natural bodies; or, it is that part of natural philosophy which treats of the various phenomena of nature in a scientific and speculative way; in which sense, neither chemistry nor experimental philosophy are included under it. However, as experiments ought always to precede any reasonings concerning the natures and properties of natural bodies, we have given the rules to be observed in drawing conclusions from them under the article **EXPERIMENTAL PHILOSOPHY**.

If we take a view of the several phenomena, and compare them together, we may observe some likeness and conformity between them. For example, in the falling of a stone to the ground, in the rising of the sea towards the moon, in cohesion and crystallization, there is something alike; namely, an union or mutual approach of bodies: so that any one of these, or the like phenomena, may not seem strange or surprising to a man who has nicely observed and compared the effects of nature: for that only is thought so which is uncommon, or a thing by itself, and out of the ordinary course of our observation. That bodies should tend towards the center of the earth is not thought strange, because it is what we perceive every moment of our

lives; but that they should have a like gravitation towards the center of the moon, may seem odd and unaccountable to most men, because it is discerned only in the tides; but a philosopher, whose thoughts take in a larger compass of nature, having observed a certain similitude of appearances, as well in the heavens as the earth, that argue innumerable bodies to have a mutual tendency towards each other, which he denotes by the general name attraction, whatever can be reduced to that he thinks justly accounted for; and thus he explains the tides by attraction. See the articles **ATTRACTION** and **TIDES**.

If therefore we consider the difference there is betwixt natural philosophers and other men, with regard to their knowledge of the phenomena, we shall find it consists only in a greater largeness of comprehension; whereby analogies, harmonies, and agreements are discovered in the works of nature, and the particular effects explained; that is, reduced to general rules, which rules, grounded on the analogy and uniformness observed in the production of natural effects, are most agreeable and sought after by the mind; for that, they extend our prospect beyond what is present and near to us, and enable us to make very probable conjectures touching things that may have happened at very great distances of time and place, as well as to predict things to come; which sort of endeavour towards omniscience, is much affected by the mind.

Among physicians, the term physiology denotes the history of the human body and its several constituent parts, with their relations and functions.

PHYTEUMA, **CRETIC RAMPIONS**, in botany, a genus of the pentandria-monogynia class of plants, the flower of which is composed of a single stellated petal: the fruit is a roundish capsule, and contains three cells, with numerous seeds.

PHYTOLACCA, in botany, a genus of the decandria-decagynia class of plants, the corolla whereof consists of five roundish, hollow, patent petals: the fruit is an orbiculated depressed berry, with ten longitudinal furrows, and as many cells, in each of which is a single kidney-shaped seed.

PHYTOLOGY, a discourse concerning the kinds and virtues of plants.

PIA MATER, in anatomy, the third tunic or membrane of the brain, placed immediately

mediately under the tunica arachnoides, and closely and firmly connected to the brain: it not only extends over the whole surface of the brain, but insinuates itself into all its cavities, and is carried down to the bottom of all its furrows. It covers also the spinal marrow, and all the nerves, and adheres also to the tunica arachnoides very closely and firmly, in the upper part of the head; but much less so below, with the dura mater.

Its blood vessels are common to the rest of the brain, and are very numerous; so that it seems in a manner wholly composed of them. The arteries are from the internal carotids and vertebrales: some of the veins discharge themselves into the sinuses of the dura mater, and others immediately into the jugular and vertebral veins. The use of the pia mater is to support the blood vessels of the brain, which it also serves as a covering to, that they may be the more conveniently distributed through all its furrows and anfractuositities; for secreting proper fluids in the brain, and forming the animal spirits.

PIACE, SE PIACE, or AD LIBITUM, in the Italian music, signifies, that the part it is joined to may be repeated or not, at pleasure.

PIACENZA, or PLACENTIA. See the article PLACENTIA.

PIACHE, or PIAZZA. See PIAZZA.

PIANOSA, an island of Italy, in the Tuscan sea, situated a little south-west of the isle of Elba, and subject to Tuscany, east long. 11° , north lat. $42^{\circ} 36'$.

PIASTER, a Spanish coin, more ordinarily called a piece of eight. See the article *Spanish Coins*.

PIAVA, a river of Italy, which rises in Tyrol, and falls by two mouths into the gulph of Venice.

PIAZZA, in building, a portico, or covered walk, supported by arches. See the article PORTICO.

PICA, in zoology, the largest animal of the mus, or mouse kind, being as big as a pig of a week old: it is of a brown colour spotted with grey, and with a white belly; the upper lip is divided, and a little longer than the under one; the ears are short, and obtuse; the body is thick and fleshy, and the legs short, especially the fore ones. See plate CXCIX. fig. 1.

It is a native of the East-Indies, and South-America; its voice is like that of a hog, and it strikes with the head in the

manner of that animal, and raises the bristles on the back when angry: hence, Ray calls it *mus brasiliensis magnus, porcelli pilis et voce*.

PICA, in medicine, a depravation of appetite, which makes the patient long for what is unfit for food, or incapable of nourishing, as chalk, ashes, coals, plaster, lime, &c. See MALACIA.

PICÆ, in ornithology, a class of birds, which have the beak convex and compressed.

This class comprehends several genera; as, the ramphastos, buceros, corvus, picus, &c. See RAMPHASTOS, &c.

PICARDS, a sect so called from their leader, one Picard, a Fleming, who, about the beginning of the fifteenth century, improved upon the error of the Adamites, in respect to nakedness; and who pretended that he was sent into the world, as another Adam, to restore the law of nature, which, he said, consisted principally of two things, a community of women, and a nakedness of all the parts of the body.

PICARDY, a province of France, bounded by the French Netherlands and the Straights of Dover, on the north and east; by the isle of France, on the south; and by Normandy and the English channel, on the west.

PICIGHITONE, a town of Italy, in the dutchy of Milan, thirty-three miles south-east of the city of Milan.

PICKAGE, or PICCAGE, an antient custom or duty paid at fairs and markets, for breaking the ground, and pitching up stalls or standings.

PICKEERING, or PICQUEERING. See the article PICQUEERING.

PICKERING, a market-town of Yorkshire, twenty-two miles north-east of York.

PICKET, PICQUET, or PIQUET, in fortification, a painted staff shod with iron; used in marking out the angles and principal parts of a fortification, when the engineer is tracing out a plan upon the ground.

There are also larger pickets, or painted stakes, which are driven into the earth to hold together fascines or faggots, in any work cast up in haste.

Pickets are likewise the stakes driven into the ground near the tents of the horsemen in a camp; to tie their horses to; and before the tents of the foot, where they rest their musquets or picks about them in a ring. The same name is also given to

to the stakes with notches towards the top, to which are fastened the cordages of tents: thus to plant the picket is to encamp. When a horseman has committed any considerable offence, he is sometimes sentenced to stand upon the picket, which is to have one hand and the opposite foot tied together, and being drawn up from the ground by the other hand, he is obliged to stand with one foot on the point of a picket or stake, so that he can neither stand nor hang without great pain, nor ease himself by changing feet.

PICKET-GUARD. See **PICQUET-GUARD.**

PICKLE, a brine or liquor, commonly composed of salt, vinegar, &c. sometimes with the addition of spices, wherein meat, fruit, and other things are preserved and seasoned. The same name is also given to any vegetable production prepared in pickle.

The methods of pickling the various sorts of vegetables, and even those of the same kind, are very different: we shall therefore content ourselves with giving one out of the numerous methods of pickling walnuts: Take walnuts before the shell is grown hard, scald them, and rub off the outer skin; then put them into water and salt for nine or ten days, shifting them every other day, and keeping them close covered from the air; then dry them, and prepare the pickle as follows: For half an hundred of large walnuts, take two quarts of white-wine vinegar; long pepper, black pepper, and ginger, of each half an ounce; cloves, mace, and nutmegs, of each a quarter of an ounce: pound the spice, and with it a spoonful of mustard-seed; strew this between every layer of walnuts, pour the liquor boiling hot upon them, and keep them close stopped.

Broom-buds, capers, and olives are pickled with oil and vinegar.

Pickles on being imported pay a duty of $7\frac{18\frac{1}{8}}{100}$ d. the gallon, and, on exportation, draw back, $6\frac{46\frac{7}{8}}{100}$ d.

PICO, one of the azores islands, situated in the atlantic ocean: west long. 20° , north lat. 39° , subject to Portugal.

PICQUEERING, PICKEERING, or PICKEROONING, a flying war or skirmish made by soldiers detached from two armies for pillage, or before a main battle begins.

PICQUET, a celebrated game at cards

played between two persons, with only thirty-two cards; all the dukes, threes, fours, fives, and sixes being set aside.

In playing at this game twelve cards are dealt to each, and the rest laid on the table: when if one of the gamesters find he has not a court-card in his hand, he is to declare that he has *carte blanche*, and tell how many cards he will lay out, and desire the other to discard, that he may shew his game, and satisfy his antagonist, that the *carte blanche* is real; for which he reckons ten. And here the eldest hand may take in three, four or five, discarding as many of his own for them, after which the other may take in all the remainder if he pleases. After discarding, the eldest hand examines what suit he has most cards of; and, reckoning how many points he has in that suit, if the other has not so many in that, or any other suit, he reckons one for every ten in that suit, and he who thus reckons most is said to win the point. It is to be observed, that in thus reckoning the cards, every card goes for the number it bears; as a ten for ten; only all court-cards go for ten, and the ace for eleven, and the usual game is one hundred up. The point being over, each examines what sequences he has of the same suit, *viz.* how many tierces, or sequences of three cards; quartes, or sequences of four cards; quintes, or sequences of five cards, &c. he has. These several sequences are distinguished in dignity by the cards they begin from: thus, ace, king, and queen, are stiled tierce major; king, queen, and knave, tierce to a king; knave, ten, and nine, tierce to a knave; and the best tierce, quarte, or quinte prevails, so as to make all the others in that hand good, and to destroy all those in the other hand. In like manner a quarte in one hand sets aside a tierce in the other.

The sequences over, they proceed to examine how many aces, kings, queens, knaves and tens each holds; reckoning for every three of any sort, three; but here too, as in sequences, he that with the same number of threes or fours, has one that is higher than any the other has, makes his own good, and sets aside all his adversary's; but four of any sort, which is called a quatorze, because fourteen are reckoned for it, always set aside three.

The game in hand being thus reckoned, the

the eldest proceeds to play, reckoning one for every card he plays above nine, while the other follows him in the suit: but unless a card be won by one above nine, except it be the last trick, nothing is reckoned for it. The cards being played out, he that has most tricks reckons ten for winning the cards: but if they have tricks alike, neither reckons any thing. If one of them wins all the tricks, instead of ten, which is his right for winning the cards, he reckons forty, and this is called capot.

The deal being finished, each person sets up his game: they then proceed to deal again as before; cutting afresh each time for the deal: if both parties are within a few points of being up, the *carte blanche* is the first that reckons, then the point, then the sequences, then the quatorzes, then the tierces, and then the tenth cards. He that can reckon thirty in hand by *carte blanche*, points, quintes, &c. without playing, before the other has reckoned any thing, reckons ninety for them, and this is called a repique; and if he reckons above thirty, he reckons so many above ninety. If he can make up thirty, part in hand, and part in play, before the other has told any thing, he reckons for them sixty; and this is called a pique, whence the name of the game. Mr. de Moivre, in his doctrine of chances, has resolved, among others, the following problems: 1. To find, at picquet, the probability which the dealer has for taking one ace or more in three cards, he having none in his hands. He concludes from his computation, that it is 29 to 28 that the dealer takes one ace or more. 2. To find at picquet the probability which the eldest has of taking an ace or more in five cards, he having no ace in his hands. Answer; 232 to 91, or 5 to 2, nearly. 3. To find at picquet the probability which the eldest has of taking both an ace and a king in five cards, he having none in his hand. Answer; the odds against the eldest hand taking an ace and a king are 331 to 315, or 21 to 20 nearly. 4. To find at picquet the probability of having twelve cards dealt to, without king, queen, or knave; which case is commonly called *cartes blanches*. Answer; the odds against *cartes blanches* are 323 to 578956, or 1791, to 1 nearly. 5. To find how many different sets essentially different from one another, one may have at picquet before taking in. Answer; 28,967,278. This num-

ber falls short of the sum of all the distinct combinations, whereby twelve cards may be taken out of 32, this number being 225,792,840; but it ought to be considered, that in that number several sets of the same import, but differing in suit, might be taken, which would not introduce an essential difference among the sets.

PICRA, or HIERA PICRA. See the article HIERA PICRA.

PICRIS, *langue de beuf*, in botany, a genus of the syngenesia-polygamia-æqualis class of plants, the compound flower of which is imbricated and uniform, with equal and numerous hermaphrodite corollulæ; the partial flower is monopetalous, ligulated, lineated, truncated, and quinquedentated; there is no pericarpium; the seed, which is contained in the cup, is single, ventricose, obtuse, and crowned with a plumose pap.

PICTS-WALL, in antiquity, a wall begun by the emperor Adrian, on the northern bounds of England; to prevent the incursions of the Picts and Scots. It was first made only of turf, strengthened with palisadoes, till the emperor Severus coming in person into Britain built it with solid stone. This wall, part of which still remains, begun at the entrance of Solway-frith in Cumberland, and running N. E. extended to the German ocean.

PICTURE, a piece of painting, or a subject represented in colours, on wood, canvas, paper, or the like.

Pictures four feet square, or containing 16 superficial feet, or upward, on being imported pay 3 l. those of two feet square, or four superficial feet, and under 16 feet, pay 2 l. and those under two feet square, or four superficial feet, pay 1 l.

PICUS, the WOOD-PECKER, in ornithology. See the article WOOD-PECKER.

PIECE, in commerce, signifies sometimes a whole, and sometimes a part of the whole. In the first sense, we say a piece of cloth or velvet, &c. meaning a certain quantity of yards regulated by custom; being yet entire, and not cut. In the other signification we say a piece of tapestry; meaning a distinct member wrought apart, which, with several others, make one hanging.

PIECE, in matters of money, signifies sometimes the same thing with species; and sometimes by adding the value of the pieces, it is used to express such as have no other particular name. For the piece of eight or piastre, see COIN.

PIECE is also a kind of money of account, or rather a manner of accounting used among the negroes on the coast of Angola in Africa. See the article **MONEY**.

PIECE, in heraldry, denotes an ordinary or charge. See the articles **ORDINARY** and **CHARGE**.

The honourable pieces of the shield are the chief, fesse, bend, pale, bar, cross, saltier, chevron, and in general all those which may take up one third of the field, when alone, and in what manner soever it be. See **CHIEF**, **FESSE**, &c.

PIECES, in the military art, include all sorts of great guns and mortars. Battering pieces are the larger sort of guns used at sieges for making the breaches, such are the twenty-four pounder, and culverine, the one carrying twenty-four, and the other an eighteen, pound-ball. Field pieces are twelve-pounders, demiculverines, six-pounders, sakers, minions, and three-pounders, which march with the army, and encamp always behind the second line, but in day of battle are in the front. A soldier's firelock is likewise called his piece.

PIED DE PORT, St. JOHN, a town of France, in the province of Gascony, at the foot of the Pyrenees, situated sixteen miles south of Bayonne.

PIEDMONT, a principality of Italy, so called from its lying at the foot of the Alps. It is bounded by Savoy, from which it is separated by the Alps on the north, by the duchies of Milan and Montferrat on the east, by the territories of Genoa and the county of Nice on the south, and by France on the west; being about 100 miles long and 70 broad.

PIEDOUCHE, in architecture, a little stand or pedestal, either oblong or square, enriched with mouldings; serving to support a bust, or other little figure.

PIEDROIT, in architecture, a pier or square kind of pillar, part whereof is hid within a wall. The only thing wherein it differs from a pilaster is, that the latter has a regular base and capital, which the other wants. See **PILASTER**.

This term is also used for part of the solid wall annexed to a door or window, comprehending the door-post, chambranle, tableau, leaf, &c.

PIENZA, a town of Italy, in the duchy of Tuscany and territory of Sienna, twenty eight miles south-east of Sienna.

PIEPOWDER COURT, or **PEDES PULVERISATI**, a court held in fairs for doing justice to buyers and sellers, and

redressing disorders there committed.

It is so called, as being most usually held in the summer, when the suitors to the court have dusty feet, &c. This is a court of record, incident to every fair, and is to be held only during the time the fair is kept. For its jurisdiction, the cause of action on any contract, &c. must arise in the same fair, or market, and not before at a former fair, not after the fair, and be done, complained of, heard, and determined, the same day. The steward is judge, and the trial is by merchants and traders in the fair, and judgment against the defendant shall be that he be amerced, &c.

PIER, or **PEER**, in building, denotes a mass of stone, &c. opposed by way of fortress against the force of the sea, or a great river, for the security of ships that lie at harbour in any haven.

It is also used in architecture for a kind of pilaster, or buttress, raised for support, strength, and sometimes for ornament.

PIERCED, **PERCE'**, in heraldry, is when any ordinary is perforated, or struck through, shewing, as it were, a hole in it, which must be expressed in blazon, as to its shape: thus if a cross have a square hole, or perforation in the centre, it is blazoned square-pierced, which is more proper than quarterly-pierced, as Leigh expresses it. When the hole or perforation is round, it must be expressed round-pierced; if it be in the shape of a lozenge, it is expressed pierced lozenge-ways. All piercings must be of the colour of the field, and when such figures appear on the centre of a cross, &c. of another colour, the cross is not to be supposed pierced, but that the figure on it is a charge, and must be accordingly blazoned.

PIERCING, among farriers. To pierce a horse-shoe lean, it is to pierce it too near the edge of the iron: to pierce it fat, is to pierce it farther in.

St. PIERRE DE MONTIER, a town of France, in the province of Orleans, and territory of Nivernois, situated ten miles south of Nevers.

PIETANTIA, or **PITTANCE**, a portion of victuals distributed to the members of a college, or other community, upon some great festivals.

PIETISTS, a religious sect sprung up among the protestants of Germany, seeming to be a kind of mean between the quakers of England, and the quietists of

of the Romish church. See the article *QUAKERS*, &c.

They despise all sorts of ecclesiastical polity, all school theology, and all forms and ceremonies, and give themselves up to contemplation and the mystic theology.

PIEVE DE CUDORE, or *CONDORÉ*, a town of Italy, in the territory of Venice, capital of the province of Cadore, in east long. $12^{\circ} 30'$, north lat. $46^{\circ} 40'$.

PIG, in zoology, the young of the hog kind. See the article *HOG*.

Guinea-Pig. See the article *GUINEA-PIG*.

PIG of lead, the eighth part of a fother, amounting to two hundred and fifty pounds weight.

PIGEON, in ornithology. See the article *COLUMBA*.

PIGEON-HOUSE, a house erected full of holes within for the keeping, breeding, &c. of pigeons, otherwise called a *dove-cote*.

Any lord of a manor may build a pigeon-house on his land; but a tenant cannot do it without the lord's licence.

When persons shoot at or kill pigeons within a certain distance of the pigeon-house, they are liable to pay a forfeiture.

PIGMENTS, *pigmenta*, preparations used by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours.

When glass is stained and coloured, as in painting on glass, or for counterfeiting gems, or precious stones, the pigment is always of a metalline or mineral nature. See the article *COLOUR*, &c.

PIGNEROL, a town of Italy, in the province of Piedmont, situated on the river Chizon, ten miles south-west of Turin.

PIGUS, in ichthyology, a species of the cyprinus. See the article *CYPRINUS*.

This fish is of the same shape and size with the common carp, and its eyes, fins, and fleshy palate wholly the same. From the gills to the tail there runs a dotted crooked line.

PIGMY, or *PYGMY*. See *PYGMY*.

PIKE, an offensive weapon, consisting of a shaft of wood, twelve or fourteen feet long, headed with a flat-pointed steel, called the spear. The pike was a long time in use among the infantry, to enable them to sustain the attack of the cavalry, but it is now taken from them, and the bayonet, which fixes on at the end of the carbine is substituted in its place. Yet the pike still continues the

weapon of foot-officers, who fight pike in hand, salute with the pike, &c.

PIKE, in ichthyology, the same with *lucius*. See the article *LUCIUS*.

PIKE-FISHING. See the article *FISHING*.

PILA, in building, the same with pier. See the article *PIER*.

PILA, among antiquarians, denotes the arms-side of a piece of money, which was probably so called because it antiently bore the impression of a church built on piles.

PILASTER, in architecture, a square column, sometimes insulated, but more frequently let within a wall, and only shewing a fourth or fifth part of its thickness. The pilaster is different in different orders; it borrows the name of each, and has the same proportions, and the same capitals, members and ornaments with the columns themselves. Pilasters are however usually made without either swelling or diminution, and as broad at top as at the bottom; though some of the modern architects, as M. Mansard, &c. diminish them at the top, and even make them swell in the middle, like columns, particularly when placed behind columns.

Mr. Perrault observes, that pilasters, like columns, become of different kinds, according to the different manner in which they are applied to the wall. Some are wholly detached, and these Vitruvius calls *parastatæ*; others have three faces clear out of the wall; others two; and others only one; these Vitruvius calls *antæ*. Insulate pilasters are but rarely found in the antique; for the chief use the antients made of them, was to give the greater strength to the extremities of porticoes.

There are four things to be principally regarded in pilasters, their projecture out of the wall; their diminution; the disposition of the entablature, when it happens to be common to them and to a column, and their flutings and capitals. 1. Then, the projecture of pilasters that have only one face out of the wall, ought to be one eighth of their breadth, or at most one sixth; but when they receive imposts against their sides, the projecture may be a quarter of their diameter. 2. Pilasters are seldom diminished when they have only one face out of the wall: indeed when they stand in the same line with columns, and the entablature is continued over both, without any break, the pilasters are to have the same dimensions with

with the columns. 3. Pilasters are sometimes fluted; though the columns that accompany them are not so; and on the contrary, the columns are sometimes fluted, when the pilasters that accompany them are not. The flutings of pilasters are always odd in number, except in half pilasters, which meet at inward angles, where four flutings are made for three, &c. 4. The proportions of the capitals of pilasters, are the same as to height with those of columns; but they differ in breadth, the leaves of pilasters being much broader; because pilasters, though of equal extent, have only the same number of leaves for their girth, *viz.* eight. Their usual disposition is to have two in each face in the lower row, one in the middle, and two halves in the angles, in the turns of which they meet. Add to this, that the rim of the vase, or tambour, is not strait, as the lower part is; but a little circular and prominent in the middle. See the article FLUTINGS.

In pilasters that support arches, the proportions, according to Palladio, should be regulated by the light they are placed in; and at the angles by the weight they are to sustain; they must not be too tall and slender, lest they resemble pillars, nor too dwarfish and gross, lest they appear like the piers of bridges. In private buildings they ought not to be narrower than one third, nor broader than two thirds of the vacuity, or interspace between pilaster and pilaster; but as for those that stand at the corners, they may have a little more latitude allowed them, to give the greater strength to the angles. Palladio observes, that in the theatres and amphitheatres, and such massive works, they have been as broad as the half, and sometimes as the whole vacuity or interspace. He also asserts, that their true proportion should be an exact square; but for lessening of expence, they are usually made narrower in flank than in front.

PILAW, a port-town of Poland, in the territory of ducal Prussia, situated on the Baltic, east long. 20°, north lat. 54° 45', subject to the king of Prussia.

PILCHARD, *pilchardus*, in ichthyology, a species of clupea, with the upper jaw bifid, and spotted on each side with black. See the article CLUPEA.

PILE, in antiquity, a pyramid built of wood, on which the bodies of the deceased were laid in order to be burnt.

PILE, in building, is used for a large

stake rammed into the ground in the bottom of rivers, or in marshy land, for a foundation to build upon.

Pile is also used among architects for a mass of building.

PILE, in coinage, denotes a kind of punchon, which in the old way of coining with the hammer, contained the arms, or other figure and inscription to be struck on the coin. See COINAGE.

Accordingly we still call the arms side of a piece of money the pile, and the head, the cross; because in antient coin, a cross usually took the place of the head in ours: but some will have it called pile, from the impression of a church built on piles, struck on this side our antient coins, and others will have it to come from *pile*, the old french word for a ship.

PILE, in heraldry, an ordinary in form of a wedge, contracting from the chief, and terminating in a point towards the bottom of the shield. See pl. CXC VII. fig. 6. The pile, like other ordinaries, is borne inverted, ingrailed, &c. and issues indifferently from any point of the verge of an escutcheon.

PILES, in medicine, the same with hæmorrhoids. See HÆMORRHOIDS.

PILGRIMAGE, a kind of religious discipline, which consists in taking a journey to some holy place, in order to adore the relics of some deceased saint. Pilgrimages began to be made about the middle ages of the church; but they were most in vogue after the end of the eleventh century, when every one was for visiting places of devotion, not excepting kings and princes themselves; and even bishops made no difficulty of being absent from their churches on the same account. The places most visited were Jerusalem, Rome, Compostella; and Tours; but the greatest numbers now resort to Loretto, in order to visit the chamber of the blessed virgin, in which she was born, and brought up her son Jesus, till he was twelve years of age. This chamber, it is pretended, was carried by angels into Dalmatia, about the year 1291, and afterwards in the same manner transported to Loretto, where a magnificent cathedral is built over it. In this chamber, is the image of the blessed Virgin, almost covered with pearls and diamonds, and round the statue is, a kind of rainbow formed of precious stones of various colours. Five hundred thousand pilgrims sometimes

times resort to this house in one year, in order to pay their devotions before this glorious image.

The mahometans are commanded in the Koran, to perform a pilgrimage to Mecca; this is one of the capital points of their religion, and therefore a prodigious cavalcade of pilgrims annually go thither, in the company of those who are sent with the grand seignor's presents, to the tomb of Mahomet.

PILL, in pharmacy, a form of medicine resembling a little ball, to be swallowed whole, invented in favour of such as cannot take bitter and ill tasted medicinal draughts, as also to keep in readiness for occasional use without decaying.

Pills are a form, into which little is reduced, besides cathartics in officinal composition. The quantity of those generally assigned for a dose, will not admit of alteratives, which generally take up more room; for the force of a cathartic commonly lying in a small compass, half a dram, which makes four, five, or six pills, is generally sufficient for a dose, while a dose of most alteratives would amount to fifteen or twenty. But nothing ought to be made up in this form that is soluble by the air, as many salts are, because they will run, and destroy the form; and for the same reason, nothing ought to be thus mixed, that will ferment; upon which account, all volatile salts are to be excluded, because they would make the pills swell to six times the bulk.

Some of the most useful pills of the shops, are, 1. Aromatic pills, thus made: take of succotrine aloes, an ounce and a half, of gum guaiacum, an ounce; the aromatic species and balsam of peru, of each half an ounce: let the aloes and gum guaiacum be powdered separately, then mixed with the rest, and formed into a mass with the syrup of orange peel. 2. The more simple pills of colocintida, are thus prepared: Take the pith of colocintida, and scammony, of each two ounces; of oil of cloves, two drams: let the dry species be reduced to powder separately, let the oil be mixed with them, and the whole be formed into a mass with syrup of buckthorn. 3. Ecphractic, or deobstruent pills are thus prepared: take of the aromatic pill, three ounces; rhubarb, extract of gentian, and salt of iron, of each one ounce; of salt of wormwood, half an ounce: beat them with a proper quantity of solutive syrup of roses,

into a mass. 4. Gum-pills, thus prepared: take galbanum, opopanax, myrrh, sagapenum, of each an ounce; of asafœtida, half an ounce: make them into a mass with the syrup of saffron. 5. Mercurial pills, prepared thus: take of quick-silver, five drams; of strasburg turpentine, two drams; of the cathartic extract, four scruples; of rhubarb, in powder, one dram: first grind the quick-silver with the turpentine, till it appear no longer, then beat them up with the rest, into a mass: if the turpentine chance to be too thick, it is to be thinned with a little oil of olives. 6. Soap-pills, thus prepared: take of almond-soap, four ounces; of strained opium, half an ounce; of essence of lemons, a dram. Beat the opium, softened with a little wine, along with the rest, till they are perfectly mixed. 7. Storax pills, prepared thus: take of strained storax, two ounces; of saffron, an ounce; of strained opium, five drams: beat them together, till they are perfectly mixed, and make them into pills.

PILLAGE, among builders, is a square pillar, standing behind a column, to bear up arches.

PILLAR, in architecture, a kind of irregular column, round and insulated, but deviating from the proportions of a just column.

Pillars are always either too massive, or too slender for regular architecture; such are the pillars which support gothic vaults, or buildings; and indeed, they are not restrained by any rules, their parts and proportions being arbitrary.

Butting **PILLAR**, the same with a buttress, See the article **BUTTRESS**.

Square **PILLAR**, a massive work, called also a pier or piedroit, serving to support arches, &c.

PILLAR, in the manege, is the center of the ring, or manege-ground, round which a horse turns, whether there be a pillar in it or not. Besides this, there are pillars on the circumference, or sides of the manege-ground, placed at certain distances, by two and two, from whence they are called the two pillars, to distinguish them from that of the center. The use of the pillar in the center, is for regulating the extent of ground, that the manege upon the volts may be performed with method and justness, and that they may work in a square, by rule and measure, upon the four lines of the volts; and also to break unruly high-mettled horses

horses, without endangering the rider. The two pillars are placed at the distance of two or three paces, one from the other, and the horse is put between those, to teach him to rise before, and yerk out behind, and put himself upon raised airs, &c. either by the aids, or chaffiseiments.

PILLORY, was antiently a post erected in a cross road, by the lord of the manor, with his arms upon it, as a mark of his seignory, and sometimes with a collar to fix criminals to. At present, it is a wooden machine, made to confine the head and hands, in order to expose criminals to public view, and to render them publicly infamous. According to Sir Henry Spelman, it was first peculiarly intended for the punishment of bakers, who should be found faulty in the weight or fineness of their bread. At present the persons thus punished, are forestallers, those using false weights, persons guilty of perjury, &c.

PILOT, a person employed to conduct ships over bars and sands, or through intricate channels, into a road or harbour.

Pilots are no constant and standing officers aboard our vessels, but are called in occasionally, on coasts or shores unknown to the master, and having piloted in the vessel, they return to the shore where they reside.

Pilots taking upon them to conduct ships up the Thames, are to be examined and approved by the master and wardens of the trinity-house at Deptford, or shall be liable to forfeit 10 l. for the first offence, and 20 l. for the second, &c. and the like penalty, if they act without licence from the said master and wardens; and if by their negligence they lose a ship, they shall be forever disabled. 3 Geo. I. and 5 Geo. II. c. 20.

PILSEN, or **BILSEN**. See **BILSEN**.

PILSEN is also a city of Bohemia, forty miles south-west of Prague.

PILULARIA, in botany, a genus of the cryptogamia-musci class of plants; the male flowers of which are disposed like a line of dust under the leaf; the fruit is a globe containing four cells, in which are lodged a great many seeds.

PILY, or *Barry Pily*. See **BARRY**.

PILZOW, a town of little Poland, forty-two miles north-east of Cracow.

PIMENTA, or **PIMENTO**, **JAMAICA-PEPPER**, or **ALL-SPICE**, in botany, a tree of a moderate size, called by Sir Hans Sloane, *myrtus arborea aromatica*,

foliis laurinis, latioribus, et subrotundis: its flower consists of five petals, and its fruit is a roundish berry, containing a pulpy matter about the seeds.

The fruits are gathered when green, and are exposed to the sun for many days on cloths, frequently shaking and turning them, till thoroughly dry; they take great care they are not wetted by the morning and evening dews, and when thus dried, are sent over to us.

Pimenta abounds with a fragrant essential oil, which is separated, in great quantity, in distillation, and is so heavy that it sinks in water. This spice is much used in our foods, and sometimes in medicine: it is, indeed, a very good aromatic, and so well imitates the mixed flavour of all the rest, that it has long been a common practice to make the aqua mirabilis, which was ordered to be distilled from all the spices, of this ingredient alone; and the taste of the water thus made, when carefully done, is so near the genuine, that a very nice palate can only distinguish it.

The present college dispensatory orders a simple water to be distilled from it, a gallon from half a pound of that spice, which is a better carminative, than any of the former waters retained under that name.

PIMPINELLA, in botany, a plant of the pentandria-digynia class, the general corolla of which is uniform; and the partial one consists of five inflexo, cordated and almost equal petals; there is no pericarpium; the fruit is of an oval oblong figure, narrower towards the apex, convex and striated on one side, and plain on the other.

PIMPLE, in surgery, a small pustule, arising chiefly on the face. See the article **PUSTULE**.

PIN, in commerce, a little necessary implement made of brass-wire, used chiefly by the women in adjusting their dress.

The perfection of pins consists in the stiffness of the wire and its whiteness, in the heads being well turned, and in the fineness of the points. The London pointing and whitening, are in most repute, because our pin-makers, in pointing, use two steel-mills, the first of which forms the point, and the latter takes off all irregularities, and renders it smooth, and as it were polished; and in whitening, they use block-tin granulated: whereas in other countries they are said to use a mixture of tin, lead, and

Fig. 1. PERSICA, the PEACH.



Fig. 3. PEPPER.



Fig. 2. The PINE-TREE.



Fig. 4. PHEONS.

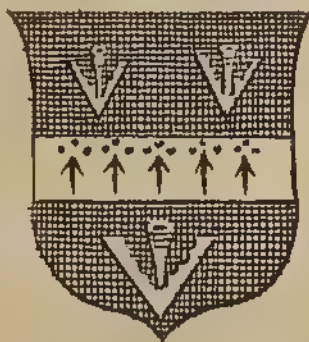


Fig. 7. PLATEA, the SPOON-BILL.

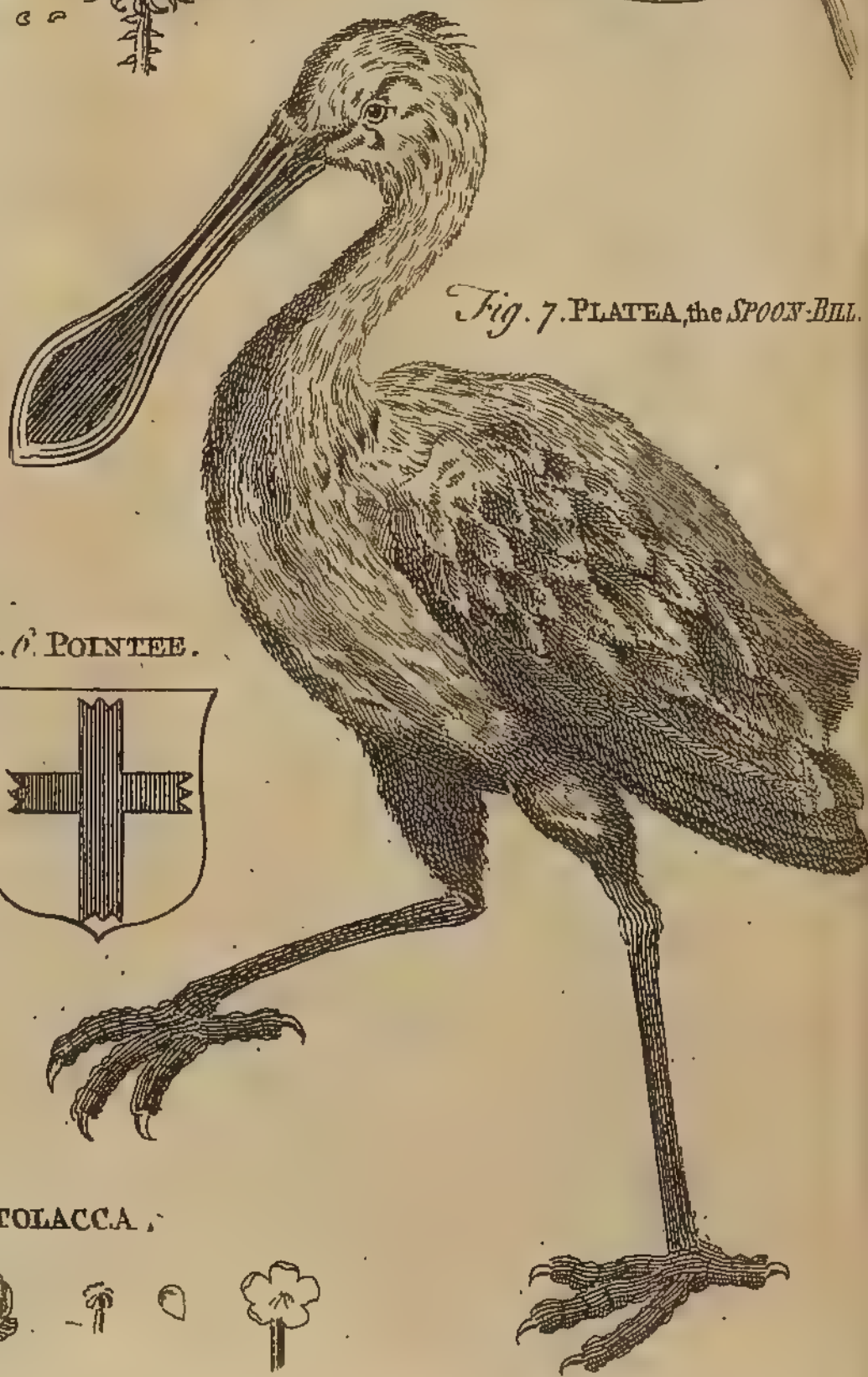


Fig. 5. POMEE.



Fig. 6. POINTEE.



Fig. 8. PHYTOLACCA.



and quick-silver; which not only whitens worse than the former, but is also dangerous, on account of the ill quality of that mixture, which renders a puncture with a pin thus whitened, somewhat difficult to be cured. The consumption of pins, is incredible, and there is no commodity sold cheaper. The number of hands employed in this manufacture is very great, each pin passing through the hands of six different workmen, between the drawing of the brass wire, and the sticking of the pin in the paper.

Pins are sometimes made of iron-wire, rendered black by a varnish of linseed-oil, with lamp-black, which the brass-wire would not receive: these are designed for the use of persons in mourning, though not universally approved of. Pins on being imported, pay for every twelve thousand, 9 s. 7 $\frac{1}{2}$ d. and, on exportation, draw back 8 s. 5 $\frac{1}{4}$ d. they also pay, if made of brass, for every twelve thousand, 2 s. 4 $\frac{12\frac{1}{2}}{100}$ d. and if made of

iron, for every 112 pounds, 4 s. 8 $\frac{1}{4}$ d. is drawn back on exportation.

PINACIA, *πινασία*, among the Athenians, tablets of brass, whereon the names of all the persons in each tribe duly qualified, and willing to be judges or senators of the areopagus, being severally written, they were cast into a vessel provided on purpose; and into another vessel were cast the same number of beans, an hundred of which were white, and all the rest black. Then the names of the candidates and the beans were drawn one by one; and those, whose names were drawn out together with the white beans, were received into the senate. See the article **AREOPAGUS**.

PINCHING, in gardening, a kind of pruning, performed by nipping off the young and tender sprigs of trees and plants, between the nails of the thumb and finger, chiefly practised in April or May, and sometimes in June and July, on the large useless branches, towards the top of a plant or tree, because they consume a great deal of the sap. See the article **PRUNING**.

PINCHING, in the manege, is when, a horse standing still, the rider holds him fast by the bridle-hand, and applies the spurs just to the hairs of his sides.

Pinching is accounted an aid, spurring a chastisement, or correction.

PINDARIC, in poetry, an ode formed in imitation of the manner of Pindar. The pindaric manner is distinguished by the boldness and height of the flights, the suddenness and surprisingness of the transitions; and the seeming irregularity, wildness, and enthusiasm of the whole. The only part remaining of Pindar's works is a book of odes, all in praise of the victors at the olympian, pythian, nemæan, and isthmian, games; whence the first is intitled the olympians, the second the pythians, the third the nemæans, and the fourth the isthmians. Pindar is full of force and fire; his thoughts are sententious; his stile impetuous; his sallies daring and frequently running, as it were, at random, he affects a beautiful disorder, which yet is said to be the effect of the greatest art. None of our writers seem to have succeeded in the pindaric character better than Cowley.

PINE, *pinus*, in botany, a genus of the monœcia monadelphia class of plants, having no corolla; the male flowers are disposed in clusters, the perianthium consists of four caducous leaves; the female flowers are disposed in globes upon the same plant: there is no pericarpium; the fruit is a large cone, of a turbinated figure, and composed of a very beautiful arrangement of squamæ: the seed is received into a membranaceous ala. See plate CC. fig. 2. The nucleus pini, or kernels of the cones of the pine, are much used in medicine; and they are not only used so; but, in places where they are to be had fresh and in plenty, are eaten at table, and make an ingredient in several good dishes. They are very proper for people inclined to be consumptive, as they are balsamic and restorative: they are also good against heats of urine, and nephritic complaints; they are either to be eaten or made into an emulsion with almonds and barley-water, or with pistachias instead of almonds. At present they are brought to us in abundance from Italy and the south of France.

PINE-APPLE, the same with ananas. See the article **ANANAS**.

PINEA, or **PINE**, in commerce, a term used in Peru and Chili, for a kind of light, porous masses, or lumps, formed of a mixture of mercury and silver-dust, from the mines. The ore or mineral of silver being dug out of the veins of the

the mine, is first broken, then ground in mills for the purpose, driven by water with iron pestles, each of two hundred pound weight: the mineral thus pulverized is next sifted; then worked up with water into a paste, which when half dry, is cut into pieces called *cuerpos*, a foot long, weighing each about two thousand five hundred pounds. Each *cuerpo* is again kneaded up with sea-salt, which dissolving incorporates with it: they then add mercury, from ten to twenty pounds for each *cuerpo*, kneading the paste afresh, until the mercury be incorporated therewith. This amalgamation is continued for eight or nine days: when it is done enough, they send it to the lavatories, which are large basons that empty successively into one another; the paste, &c. being laid in the uppermost of these, the earth is then washed from it into the rest, by a rivulet turned upon it. When the water runs quite clear out of the basons, they find the mercury and silver at bottom incorporated: this matter they call *pella*, and of this they form the *pinneas*, by expressing as much of the mercury as they can, first by putting it in woollen bags, and pressing and beating it thoroughly, then by stamping it in a kind of wooden mould, of an octagonal form, at bottom whereof is a brass plate pierced full of little holes. The matter, being taken out of the mould, is laid on a trivet, under which is a large vessel full of water, and the whole being covered with an earthen head, a fire is made around it. The mercury still remaining in the mass, is thus reduced into fumes, and at length condensing, it is precipitated into the water, leaving behind it a mass of silver grains, of different figures, which only joining or touching at the extremes, render the matter very porous and light. This then is the *pinnea*, or *pigne*, which the workmen endeavour to sell privately to the vessels trading to the south seas, and from which those who have ventured to engage in so dangerous a commerce, have made such vast gains.

PINEAL GLAND, in anatomy, a gland in the third ventricle of the brain, thus called from its resemblance to a pineapple. It is of a greyish colour, and its process and base are often medullary: this gland has often by many been supposed the peculiar seat of the soul.

It is otherwise called *conoides* and *conarion*. See **CONOIDES** and **CONARION**. **PINES-ISLAND**, a small island on the north coast of Darien or Terra Firma in America, situated in west long. 80°, north lat. 9°.

PINGUEDO, in anatomy, the same with fat. See the article **FAT**.

PINGUICULA, **BUTTER-WORT**, in botany, a genus of the *diandria-monogynia* class of plants, the corolla whereof consists of a single ringent petal; the longer lip is strait, obtuse, trifid, and supine; the shorter lip is bifid; more obtuse, and patent; the nectarium is of a corniculated figure, and is produced from the basis of the petal: the fruit is an oval capsule, compressed at the top, and containing only one cell, in which there are several small seeds, of a cylindric figure, and a loose receptacle.

PINGUIN, in botany, the name by which Dillenius calls the *ananas*. See the article **ANANAS**.

PINHEL, or **PINTEL**, a town of Portugal, in the province of Tralos montes, situated on the river Coa, west long. 7° 15', north lat. 40° 50'.

PINION, in mechanics, an arbor, or spindle, in the body whereof are several notches, which catch the teeth of a wheel that serves to turn it round: or it is a lesser wheel which plays in the teeth of a larger.

In a watch, &c. the notches of a pinion which are commonly 4, 5, 6, 8, &c. are called leaves, and not teeth, as in other wheels. For the pinions of a watch, and the leaves, turns, &c. thereof; see the article **CLOCK**.

Flying PINION. See **FLYING pinion**.

PINK, a vessel used at sea, masted and rigged like other ships, only that this is built with a round stern; the bends and ribs compassing so as that the ribs bulge out very much. This disposition renders the pinks difficult to be boarded, and also enables them to carry greater burdens than others, whence they are often used for store-ships, and hospital-ships, in the fleet.

PINK, *caryophyllus*, in botany, the english name of several beautiful species of the *dianthus*. See **DIANTHUS**.

PINNA, a **FIN**; in natural history. See the article **FIN**.

PINNA, in anatomy. The lateral and inferior part of the nose is called *pinna nasi*; and the superior and broad part of the

the external ear is denominated pinna auris. See the articles EAR and NOSE.

PINNÆ MARINÆ, in the history of the shell-fish, a name given to several of the larger muscles. See the article MUSCLE.

PINNACE, a small vessel used at sea, with a square stern, having sails and oars, and carrying three masts, chiefly used as a scout for intelligence, and for landing of men, &c. One of the boats belonging to a great man of war, serving to carry the officers to, and from, the shore, is also called the pinnacle. See the article SHIP.

PINNACLE, in architecture, the top or roof of an house, terminating in a point. This kind of roof, among the antients, was appropriated to temples; their ordinary roofs were all flat, or made in the platform way. It was from the pinnacle that the form of the pediment took its rise.

PINNATED LEAVES, *pinnata folia*, in botany, leaves formed in manner of a wing, and composed of two large ranges, or series of foliola, annexed to the two sides of one common, oblong petal. Of the pinnated leaves, however, there are several kinds. 1. The pinnated with an odd one: (plate CXC VII. fig. 3. n° 1.) this expresses the pinnated leaf, when beside the two series just mentioned, there is an odd leaf at the extremity of the petiole. 2. The pinnated without an odd leaf. *ibid.* n° 2. 3. The pinnated abrupt leaf, *ibid.* n° 3: this expresses a pinnated leaf, in which there is neither an odd leaf, nor a tendril at the end of the petiole. 4. The oppositely pinnated, which is when the folioles stand opposite to one another, on the common petiole, as in n° 2. 5. The alternately pinnated, when the folioles stand not opposite, but alternately, as in n° 1, 3, and 6. The interruptedly pinnated, in which the folioles are irregular and unequal in size and situation, *ibid.* n° 4. 7. The cirrhately pinnated, wherein the extremity of the petiole has one or more tendrils, instead of an odd leaf, *ibid.* n° 5. 8. The decurrently pinnated, in which the folioles extend beyond their proper base, in going down the petiole, and as it were, make it alated, *ibid.* n° 6. 8. The membranaceous pinnated, of the same form with the last, but with the petioles themselves membranaceous and articulated, *ibid.* n° 7. 9. The conjugated

pinnated leaf, when the whole compound leaf consists only of two folioles, on the petiole, *ibid.* n° 8: this kind of pinnated leaf may be either abrupt cirrhated, membranaceous in the petiole, or stipulated. 10. Duplicato-pinnatum, or pinnato-pinnatum, expresses a leaf composed of several others, each of which is itself composed of several smaller leaves, or foliola, *ibid.* n° 9. 11. Triplicato-pinnatum expresses a leaf, the petioles of which send out three alated subdivisions, before it has any leaves on it, *ibid.* n° 10. These last are terminated sometimes by two foliola each, and in that case, are said to be abrupt; sometimes by an odd leaf, and are then called triplicato-pinnata cum impari.

PINNATUS, in heraldry, a term used by the latin writers upon that subject, to express that sort of line in arms, which is called, by our writers, the embattled line, or crenelle.

PINNEBURG, a town of Germany, in the circle of lower Saxony, and the dutchy of Holstein, situated ten miles north of Hamburg.

PINNING, in building the fastening of tiles together, with pins of heart of oak, for the covering of an house, &c.

PINT, a vessel, or measure used in estimating the quantity of liquids, and even sometimes of dry things. See the article MEASURE.

PINTADO, in ornithology, the same with the meleagris, or turkey. See the article TURKEY.

PINTLE, among gunners, an iron, which serves to keep the gun from recoiling.

PINTLES, in a ship, are hooks by which the rudder hangs to the stern-post.

PINUS, in botany. See the article PINE.

PIOMBIONO, a city and port town of Italy, in the dutchy of Tuscany, situated on a bay of the Tuscan-sea, thirty miles south of Leghorn.

PIONEER, in the art of war, a labourer employed in an army to smooth the roads, pass the artillery along, and dig lines and trenches, mines, and other works.

PIONY, in botany. See PÆONIA.

PIP, or PEP, *Pepia*, a disease among poultry, consisting of a white thin skin, or film, that grows under the tip of the tongue, and hinders their feeding. It usually arises from want of water, or from the drinking puddle-water, or eating filthy meat. It is cured by pulling off the film with the fingers, and rubbing

the tongue with salt. Hawks are particularly liable to this disease, especially from feeding on stinking flesh.

PIPE, in building, &c. a canal, or conduit, for the conveyance of water and other liquids. Pipes for water, water-engines, &c. are usually of lead, iron, earth, or wood: the latter are usually made of oak or elder. Those of iron are cast in forges, their usual length is about two feet and a half; several of these are commonly fastened together by means of four screws at each end, with leather or old hat between them, to stop the water. Those of earth are made by the potters; these are fitted into one another, one end being always made wider than the other. To join them the closer, and prevent their breaking, they are covered with tow and pitch: their length is usually about that of the iron-pipes. The wooden pipes are trees bored with large iron augres, of different sizes, beginning with a less, and then proceeding with a larger successively; the first being pointed, the rest being formed like spoons, increasing in diameter, from one to six inches or more: they are fitted into the extremities of each other, as represented in plate CCI. fig. 1. and are sold by the foot.

Wooden pipes are bored as follows. The machine represented *ibid.* fig. 2. is put in motion by the wheel A, which is moved by a current of water; upon the axle of this wheel, is a cog-wheel, B, which causes the lanterns C, D, to turn horizontally, whose common axis is consequently in a perpendicular direction. The lantern D, turns at the same time, two cog-wheels, E, and F; the first E, which is vertical, turns the augre which bores the wood, and the second F, which is horizontal, causes the carriage bearing the piece to advance by means of the arms, H, I, which takes hold of the notches in the wheel, K. The first, H, by means of the notches, draws the wheel towards F, and the other, I, pushes the under-post of the wheel, in an opposite direction; both which motions tend to draw the carriage towards F, and consequently cause the augre to pierce the wood. The augre being from nine to twelve feet in length, and of a proportionable bigness, it will be necessary to have two pieces, as L, L, to support its weight, and cause it to enter the piece to be bored with the same uniformity.

Leaden pipes are of two sorts, the one

folded, the other not folded: for the construction of each sort, see the article PLUMBERY.

It appears from what has been said under the article FLUID, that we cannot only conduct water into pipes to very great distances, but bring it from one mountain to another, in pipes that go down into the interjacent vallies, and come up again, provided the reservoir into which we bring the water, be something lower than the spring from whence it comes, and whence the pipes begin: but it is necessary that we should here take notice of some impediments that often arise in practice, and show how to prevent or remedy them: the chief of these impediments arises from air in the pipes, by which the water is said to be wind-bound; by these means, a pipe of two or three inches bore, will sometimes not give more water than if it was but of one inch bore. The air may be discharged, and the pipe relieved, thus: Let A, B, C, D, *ibid.* fig. 3. be the spring from which a pipe is to bring water to the delivery at E, which suppose a mile from the spring. Now we will suppose E, to be a little lower than D; for example, four or five feet. If the surface of the water in the spring, comes down to the mouth of the pipe at D, or sometimes near it, there will be a good deal of air that will run down with the water into the pipe; and wherever the ground rises in the conduit of the pipe, this air will lodge itself in the upper parts of the pipe, as *a o m r*, and thereby diminish the water-way of the pipe, so as to force the water to pass between *o* and *n*, a passage perhaps ten times less than the pipe when free. The way to clear the pipe of this air, is by going from D, along the pipe; when you come to the first rising-ground, drive a nail at the highest part of the pipe, as at *m*, so as to make a hole through it: then taking out the nail, the air will blow out violently, till at last the water succeeds the air: then let the hole be quite stopped up; and doing this at every eminence of the pipe, the whole air will be discharged, and the full quantity of water will be brought home at E. If the spring be very much higher than the place of delivery, the places of air in the pipe will not be just at the highest part of the pipe, but a little beyond it; because the water running with greater velocity and force, drives the lodged air forward, as
may

may be seen at *o p g*, which other ways would have been at *s*; and therefore the hole must be made beyond *s*. If the end *E*, be stopped for some time, so that the water may cease to be in motion, the air will go back gradually, as appears at *u y w t*, where it may be let out.

But Dr. Desaguliers proposes to clear the pipes of air, by means of a small pipe, which he calls a rider, laid over the eminent part of the main of a pipe, as *d e f*, *ibid.* fig. 4. communicating with the main at the top of the eminence, as at *e*, with a little branch and cock *C*, which being opened when the engine is working, the air, being pushed forward, is caught at *d*, and discharged by the cock. The Dr. contrived an invention which he calls a Jack in the box, whereby air-cocks would open and shut of themselves, by the running of water, and motion of the air only. This contrivance is described in the philosophical transactions, n^o 393.

The several impediments, water in conduit-pipes, meets with from friction, pressure, &c. and the methods of remedying them, have already been taken notice of under the articles FLUID and FOUNTAIN.

PIPES of an organ. See the article ORGAN.

Bag-PIPE. See the article BAGPIPE.

Tobacco-PIPE, a machine used in the smoaking of tobacco, consisting of a long tube, made of earth or clay, having at one end a little case, or furnace, called the bowl, for the reception of the tobacco, the fumes whereof are drawn by the mouth through the other end. Tobacco-pipes are made of various fashions; long, short, plain, worked, white, varnished, unvarnished, and of various colours, &c. The Turks use pipes three or four feet long, made of rushes, or of wood bored, at the end whereof they fix a kind of a pot of baked earth, which serves as a bowl, and which they take off after smoaking.

PIPE also denotes a vessel or measure for wine, and things measured by wine-measure. See the article MEASURE.

PIPE, in mining, is where the ore runs forwards end ways in a hole, and doth not sink downwards, or in a vein.

PIPE, *pipa*, in law, is a roll in the exchequer, called also the great roll. See the next article.

PIPE-OFFICE is an office wherein a person called the clerk of the pipe, makes out

leases of crown-lands, by warrant from the lord-treasurer, or commissioners of the treasury, or chancellor of the exchequer. The clerk of the pipe makes out also all accounts of the sheriffs, &c. and gives the accomptants their quietus est. To this office are brought all accounts which pass the remembrancer's office, and remain there, that if any stated debt be due from any person, the same may be drawn down into the great roll of the pipe; upon which the comptroller issues out a writ, called the summons of the pipe, for recovery thereof; and if there be no goods or chattels, the clerk then draws down the debts to the lord treasurer's remembrancer, to write estreats against their lands. All tallies which vouch the payment of any sum contained in such accounts, are examined and allowed by the chief secondary of the pipe. Besides the chief clerk in this office, there are eight attornies, or sworn clerks, and a comptroller.

PIPER, PEPPER, in botany. See PEPPER.

PIPER, in ichthyology, a species of trigla, with a bifid rostrum, and tubulose nostrils. See the article TRIGLA.

The head of this species is very large in proportion to the body; the mouth is remarkably wide; the eyes are large, and stand at a very small distance from each other at the top of the head, and are covered with a skin; the bony covering of the head is angulated, and terminates in two horns at the hinder part; the rostrum is formed into spines, and at the upper part of the orbits of the eyes there is also a robust and crooked spine; the body is somewhat rounded, and of a conic figure, very large towards the head, and extremely small at the tail; over each of the pectoral fins there stands a very robust and sharp thorn, and there are on each side three articulated appendages: this fish grows to more than a foot in length: and, when caught, it makes a singular and loud noise.

PIPERNO, a town of Italy, in the territory of the pope, and Campania of Rome, situated fifty miles south-east of Rome, in the way to Naples.

PIPLEY, a port town of India in Asia, situated on the west side of the bay of Bengal, in east longit. 86°, and north lat. 21°.

PIQUETE. See PICKET and PICQUET.

PIQUETTE, among florists, a term used for a certain sort of carnations, which have always a white ground, and are spotted,

or, as they call it, pounced with scarlet, red, purple, and other colours.

PIQUIGNI, a town in France, of the province of Picardy, situated on the river Somme, seven miles east of Amiens.

PIRANO, a port town of Istria, in the territory of Venice, situated on a bay in the gulph of Venice, ten miles south of Cabo d'Istria.

PIRATE, **PYRATE**, or **ROVER**, *pirata*, a person, or vessel, that robs on the high seas, without permission or authority of any prince or state.

When a pirate enters into any port or haven, and there robs a merchant's ship, this is not held to be piracy, because it is not done on the high sea, but it is a robbery at the common law. In case a ship is riding at anchor on the sea, and it happens that the mariners or seamen are part in their boat, and the rest on shore, by which accident none are left in the ship; here, if a pirate shall attack her, and commit a robbery, the same is piracy. Nevertheless, the taking, by a ship at sea, in great necessity of victuals, cables, ropes, &c. such things out of another vessel, is not so, where that other vessel can spare such things, and the takers pay or give security for them. The manner of trying a pirate, is by a special commission, directed to the lord high admiral, &c. and the offence of piracy may be heard and determined, as if the robbery was committed on land; and offenders shall suffer the like pains of death, loss of lands and goods, &c. Persons combining to yield up ships to pirates, or to lay violent hands on the commanders of ships, or that correspond with any pirate, are adjudged guilty of piracy. All the proper goods of pirates are granted to the lord high admiral by patent; but not their piratical goods, which, where the owner is not known, belong to the king.

PIRITZ, a town of Germany, in the circle of Upper Saxony, and the dutchy of Pomerania, situated fifteen miles south of Stetin.

PIROUETTE, or **PYROET**, in the manege, a turn or circumvolution, which a horse makes without changing his ground, Pirouettes are either of one tread or piste, or of two. The first is an entire short turn which the horse makes upon one tread, and almost in one time, in such manner as that his head comes to the place where his tail was, without putting out his haunches. In the pirouette of

two treads or pistes, he takes a small compass of ground, almost his length, and marks both with the fore-part and the hind.

PISA, a city of Italy, in the dutchy of Tuscany, situated on the river Arno, four miles east of the sea, and ten miles north of Leghorn.

PISCA, a port-town of Peru, in south America, situated in the province of Lima: west long. 76° , south lat. 14° .

PISCARY, *piscaria*, in our antient statutes, the liberty of fishing in another man's waters.

PISCATAWAY, a harbour of New Hampshire, in America, situated in west long. 70° , and north lat. $43^{\circ} 35'$.

PISCES, in astronomy, the twelfth sign or constellation of the zodiac. The stars in pisces, in Ptolemy's catalogue, are 38; in Tycho's, 33; and in the Britannic, catalogue 109.

PISCINA, in antiquity, a large basin in a public place or square, where the roman youth learned to swim, and which was surrounded with a high wall, to prevent casting of filth into it.

It also signifies a lavatory among the Turks, placed in the middle court of a mosque or temple, where the mussulmans wash themselves before they offer their prayers. See **ABLUTION**.

PISCIS AUSTRALIS, in astronomy. See the article **AUSTRAL**.

PISCIS VOLANS, in astronomy, a small constellation of the southern hemisphere unknown to the antients, and invisible to us in these northern regions.

PISONIA, in botany, a genus of the dioecia-pentandria class of plants, the corolla whereof is of an infundibuliform shape; the tube is short; the limb is semiquinquefid acute and patulous; the fruit is an oval quinquangular capsule, formed of five valves, and containing only one cell; the seed is single, smooth, and ovato oblong.

PISSASPHALTUM, **EARTH-PITCH**, in natural history, a fluid, opaque, mineral body, of a thick consistence, of a strong smell, readily inflammable, but leaving a residuum of greyish ashes after burning. It arises out of the cracks of rocks, in several places in the island of Sumatra, and in some other parts of the East Indies, and is much esteemed there, in paralytic disorders. It is greatly recommended by the antients as an emollient, maturant, and digestive, and was used in cataplasms for ripening all sorts of tumours,

Fig. 1. PISTONS.

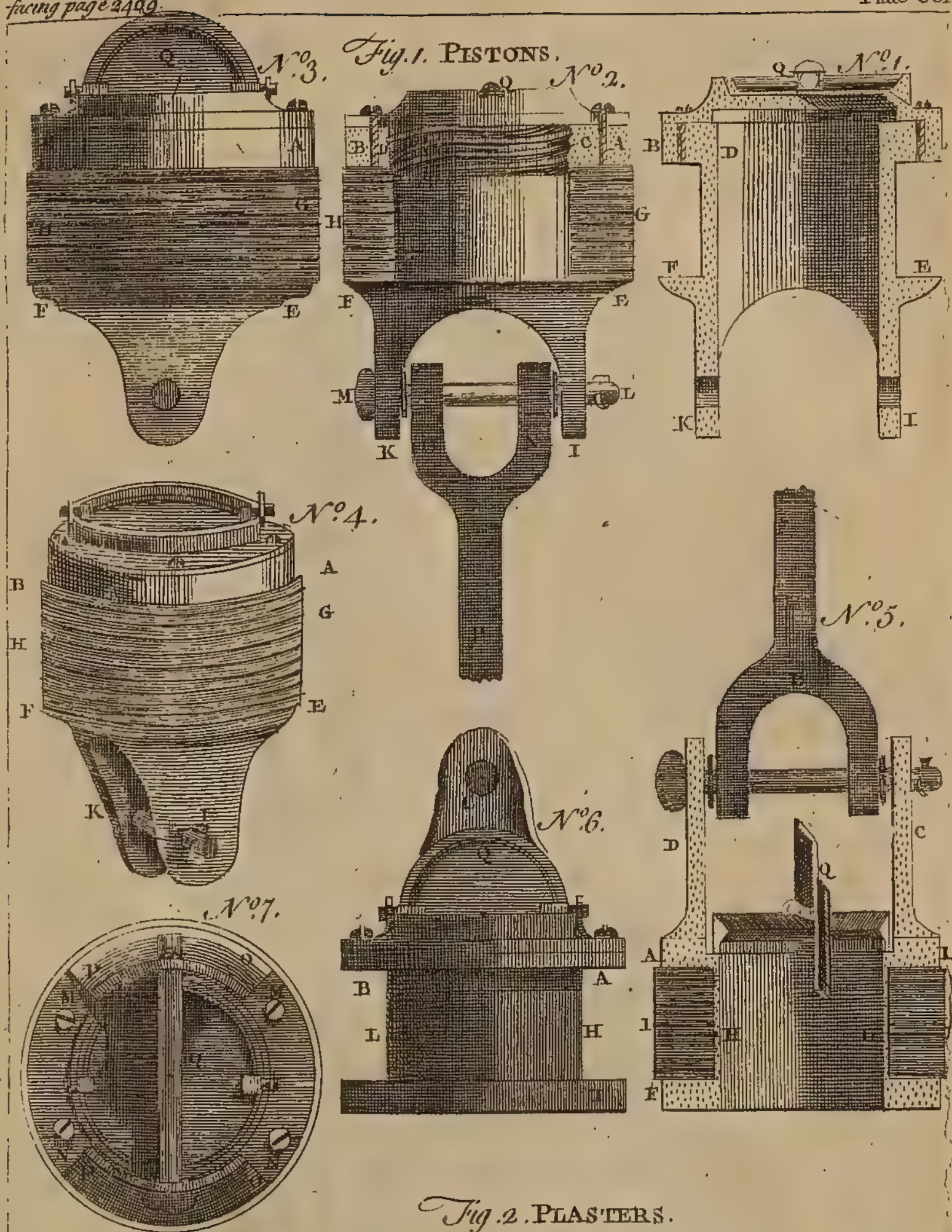
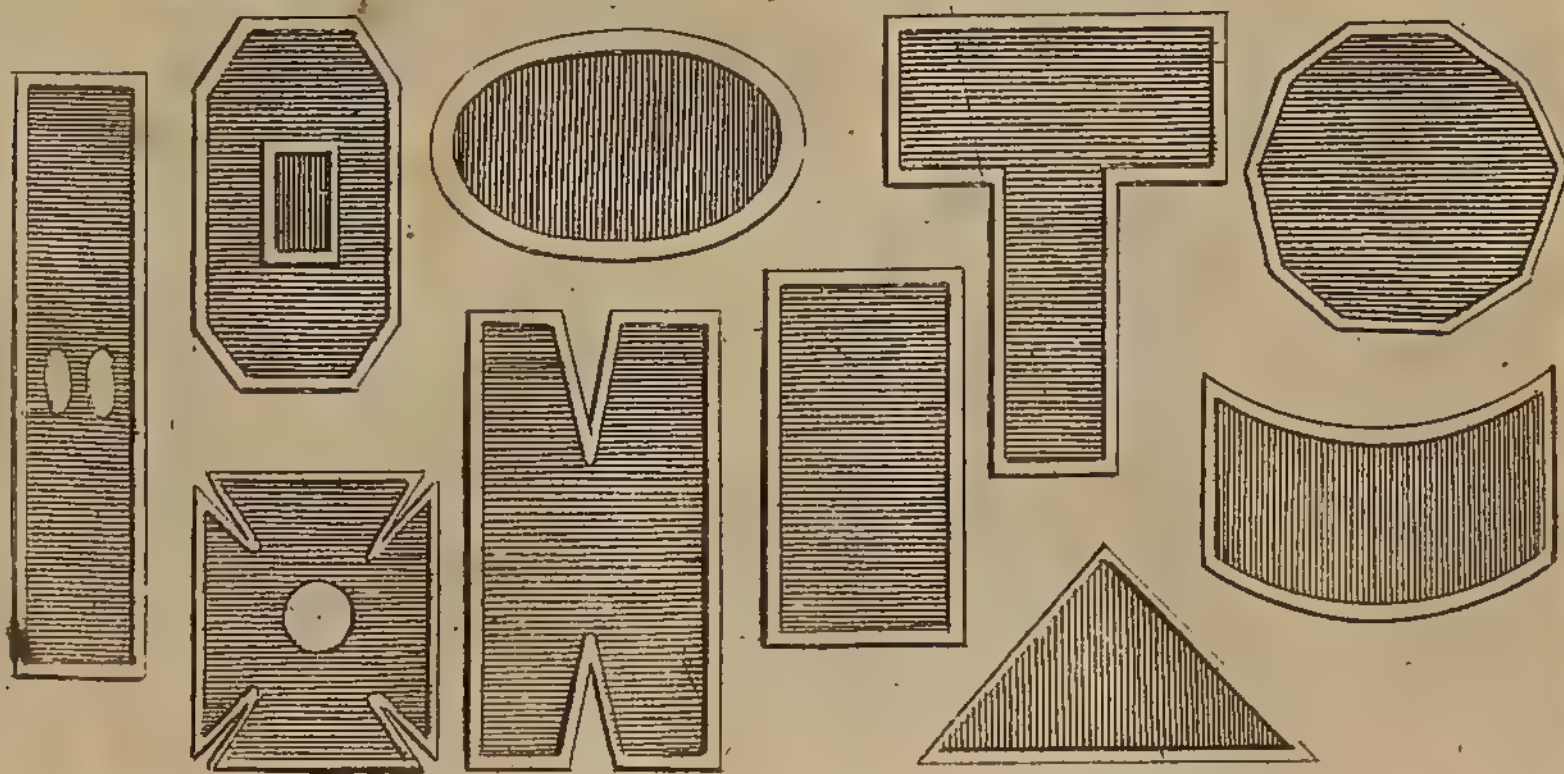


Fig. 2. PLASTERS.



mours, and against the sciatica, and other pains of the limbs.

PISSELÆUM INDICUM, BARBADOES-TAR, in natural history, a mineral fluid, of the nature of the thicker bitumens, and of all others the most approaching, in appearance, colour, and consistence, to the true pissasphaltum, tho' differing from it in other respects. It is very frequent in many parts of America, where it is found trickling down the sides of mountains in large quantities, and sometimes floating on the surface of the waters: but it seems to be almost lost at this time in the island of Barbadoes, from whence it was originally named. It has been greatly recommended internally in coughs and other disorders of the breast and lungs; but it is seldom to be met with genuine.

PISTACIA, in botany, a genus of the dioecia-pentandria class of plants, having no corolla; the fruit is a dry roundish drupe, and the seed is an oval smooth nut. This genus comprehends the mastich-tree, the turpentine-tree, and the pistachia-nut-tree.

Pistachia-nuts abound with a sweet and well-tasted oil, which they will yield in great abundance, on being pressed after bruising them: they are reckoned wholesome and nutritive, and are very proper to be prescribed by way of restoratives, eaten in a moderate quantity, and to people emaciated with long illnesses. They are recommended as peculiarly good to prevent obstructions of the liver.

PISTE, in the manege, the tread or track a horse makes upon the ground he goes over. The piste of a horse may be either single or double: if the rider makes him go but an ordinary gallop in a circle, or rather square, he will make but a single piste; if he makes him gallop with his haunches in, he will make two pistes, one with the fore part, another with the hind. And the same, if the rider makes him passage, or go side-ways, either in a straight line, or upon a circle.

PISTIA, in botany, a genus of the gynandria-hexandria class of plants, the corolla whereof consists of a single, unequal, cucullated, turbinated petal: the fruit is a roundish capsule, attenuated at the base, containing six cells, and a few truncated seeds.

PISTIL, among botanists, denotes the female organ of generation in plants; it consists of three parts, the germen, style, and stigma; the germen supplies the

place of an uterus in plants, and is of various shapes, but always situated at the bottom of the pistil, and contains the embryo-seeds: the style is a part of various forms also, but always placed on the germen: and the stigma is also of various figures, but always placed on the top of the style, or, if that be wanting, on the top of the germen.

PISTOJA, a town of Tuscany, twenty-miles north-west of Florence.

PISTOL, the smallest piece of fire-arms, borne at the saddle-bow, on the girdle, and in the pocket.

PISTOLE, a gold-coin, struck in Spain, and in several parts of Italy, Switzerland, &c. See the article COIN.

The pistole has its augmentations and diminutions, which are quadruple pistoles, double pistoles, and half-pistoles.

PISTON, *embolus*, in pump-work, is a short cylinder of metal, or other solid substance, fitted exactly to the cavity of the barrel or body of the pump.

Here follows an account of Mr. Belidor's pistons or buckets, which are either lifting or sucking. The lifting piston consists of a short hollow cylinder CDIK (plate CCII. fig. 1. n° 1, 2, 3, 4.) which has at bottom two ears, or handles, cut from the cylinder, as EI, FK, with a hole through each, which is to receive a strong pin ML (n° 2.) to join it to its lifting rod PNO. This cylinder has a broad shoulder EF, standing out to stop several rings of leather, which are slipped upon the cylinder, as you may see at GH (n° 2, 3.) There is at the upper end a male screw CD, to receive the female one AB. Upon the face or flat of this screw is fastened, with small screws, and a leather between, the valve Q; the description of which will be given under the article VALVE.

In the sucking pistons (*ibid.* n° 5, 6, 7.) the valves are not screwed to the pieces that hold and squeeze the leathers FG (by AB in the former pistons); but are fastened between the handles C, D, by means of small screws, upon a return of the cylinder: Q (n° 5.) shews the valve upright upon its bed; HL, the hollow of the cylinder; and IK, the leathers. The handle here is at top, with its rod and center-pin. N° 6. *ibid.* represents the piston with only one of its handles at C; the other being taken off, the better to shew the valve upright and in front at Q. AB is the return of the cylinder on which

which the bed of the valve is screwed; and H L, the place of the leathern rings. N^o 7. *ib.* shews the piston viewed downwards, from the center-pin that goes through the handles O P, O P, but the rod is off; M M, N N, are the places where the bed of the rod is screwed, and Q is the valve shut.

These pistons require to be very exactly turned in a lathe, and the barrels in which they work to be nicely bored, otherwise they will not be tight. However, if a thin leather be folded upwards at A B (n^o 5.) and another folded downwards at F G, they will do pretty well, notwithstanding some irregularities: such leathers may be seen in our description of the forcing-pump. See the articles FORGER and PUMP.

PISUM, the PEA, in botany, a genus of the diadelphia-decandria class of plants, with a tetrapetalous papilionaceous flower; its fruit is a large, unilocular, and bivalve pod, containing several globose seeds.

Peas are nutritive, and accordingly used for food, but rarely for any medicinal purposes, except to keep issues open; for which purpose they are rubbed with basilicon, or linimentum Arcæi.

There is also a medicinal composition called pisa, from its being made up in the form of peas. The yellow kind, pisa lutea, is made of yellow ochre, half an ounce; florentine orrice-root, two drams; yellow bees-wax, one ounce; and venice turpentine, as much as is sufficient to make them into peas: these are intended to promote the running of issues, as they draw more than common white peas. There is also a red kind, made of vermilion, half an ounce; hermodactyls, two drams; yellow bees-wax, six drams; which are to be formed into peas with turpentine.

PIT of a theatre, all that space between the amphitheatre or galleries, and theatre or stage, called by the antients orchestra. See the article ORCHESTRA.

Brine-PITS, the name given by the people of Worcestershire and Cheshire to the wells or pits affording salt-water, out of which they extract the salt. See SALT.

PITCH, a tenacious oily substance, drawn chiefly from pines and firs, and used in shipping, medicine, and various other arts: or it is more properly tar, inspissated by boiling it over a slow fire.

The method of procuring the tar, is by cleaving the trees into small billets, which

are laid in a furnace that has two apertures, through one of which the fire is put, and through the other the pitch is gathered, which, ouzing from the wood, runs along the bottom of the furnace into places made to receive it. When the smoke, which is here very thick, gives it its blackness; this is called tar, which, on being boiled, to consume more of its moisture, becomes pitch. See TAR.

There is another method of drawing pitch, used in the Levant: a pit is dug in the ground, two ells in diameter at the top, but contracting as it grows deeper; this is filled with branches of pine, cloven into shivers; the wood at the top of the pit is then set on fire, and burning downwards, the tar runs from it, out of a hole made in the bottom; and this is boiled, as above, to give it the consistence of pitch.

Pitch acquires different names, according to its different preparations, colours, and qualities: as it distils from the wood, it is called barras; but afterwards it assumes a double name, the finest and clearest being called galipot, and the coarser marbled barras. Of the galipot is made what is called white pitch, or burgundy pitch, which is nothing but the galipot melted with oil of turpentine; though some will have it a native pitch, distilling from a resinous tree growing in the mountains of Franche Comte.

Pitch from the british plantations pays on being imported, a duty of 9 s. 7½ d. for every last, containing twelve barrels, and draws back on exportation 8 s. 5¼ d. For every twelve barrels not from the british plantations, on importation, 10 s.

9 $\frac{56\frac{1}{4}}{100}$ d. and draws back, on exportation, 9 s. 7 $\frac{31\frac{1}{4}}{100}$ d.

PITH, in vegetation, the soft spongy substance contained in the central parts of plants and trees. As the substance of the trunk in trees, says Boerhaave, becomes more woody, the pith is compressed, and straitened to such a degree, that it wholly disappears. It is plain from this, that the office of the pith in vegetation, cannot be very great, since it is not of perpetual duration. By its spongy structure, it seems fitted to receive any superfluous moisture, that might transude through the pores of the woody fibres. If, by the excess of such moisture; or from any other cause, it happens to rot and perish, as frequently happens in elms, the

the tree is found to grow full as well without it; a proof it is of no essential use in vegetation.

PITHA, a port-town of Sweden, capital of the province of Pitha-Lapmark, situated on the west side of the Bothnic gulph: east long. 20° , north lat. $64^{\circ} 45'$.

PITTANCE, *pietantia*, a word chiefly used among religious, and those who live in a community, signifying the commons, or allowance of meat, be it fish, flesh, or the like, stately eaten at meals, besides bread.

PITTENWEEM, a port-town of Scotland, in the county of Fife, at the entrance of the Firth of Forth, twenty-three miles north-east of Edinburgh.

PITUITA. See **PHLEGM** and **SALIVA**.

PITUITARY GLAND, in anatomy, a gland in the brain, of the size of a very large pea, placed under the cella of the os sphenoides, under the infundibulum, wherewith it communicates, receiving from it a lymph or a juice, which the infundibulum derives from the plexus choroïdes and pineal gland; and from this lymph does the gland itself take its name. It also filtrates a juice itself, separating from the blood a white liquor, very subtle, and apparently very spirituous.

PIVAT, or **PIVOT**, a foot or shoe of iron, or other metal, usually conical, or terminating in a point, whereby a body, intended to turn round, bears on another fixed at rest, and performs its circumvolutions. The pivot usually bears or turns round in a sole, or piece of iron or brass, hollowed to receive it.

PLACAGNOSCIERIA, in natural history, the name of a genus of spars. See the article **SPAR**.

The bodies of this genus are dull and opaque, crystalline, terrene spars, formed into crusts, and of an irregular and not striated texture within. Of this genus there are three known species. 1. A hard, whitish-brown one, found very frequently on the roofs and sides of caverns on Mendip-hills, and in other parts of England. 2. A dull, crumbly, whitish one, found in many parts of England, encrusting the sides of caverns, and of fissures of stone. And, 3. A dull, pale-brown one, of a very coarse texture. This is the most common of all the bodies of this genus, and is found in variety of forms; among others, encrusting the sides and bottoms of our teakettles, and other vessels, in which water is frequently boiled,

PLACARD, or **PLACART**, among foreigners, signifies a leaf or sheet of paper, stretched out, and applied on a wall or post, containing edicts, regulations, &c. Among us, placard signifies a licence, whereby a person is permitted to use unlawful games, &c.

PLACARD, in architecture, denotes the decoration of the door of an apartment, consisting of a chambranle, crowned with its frieze or gorge, and a cornice, sometimes supported by consoles. See the article **DOOR**.

PLACE, *locus*, in philosophy, a mode of space, or that part of immoveable space which any body possesses. See **SPACE**. Place is to space or expansion, says Mr. Locke, as time is to duration. Our idea of place is nothing but the relative position of any thing with reference to its distance from some fixed and certain points. Whence we say, that a thing has or has not changed place, when its distance either is or is not altered with respect to those bodies with which we have occasion to compare it. That this is so, continues that great philosopher, we may easily gather from hence, that we have no idea of the place of the universe, though we can of all its parts. To say that the world is somewhere, means no more than that it does exist: however, the word place is sometimes taken to signify that space which any body takes up; and in this sense, according to the same author, the universe may be conceived in a place; but he thinks that this portion of infinite space possessed by the material world, might more properly be called extension.

Aristotle, and his followers, conceive place to be the immoveable and contiguous concave surface of an ambient body; so that, as Mr. Boyle observes, it is a kind of vessel, which every way contains the body lodged in it; only with this difference, that a vessel is a kind of moveable place: hence it has been usually affirmed, that what is in no place, is not at all: yet it appears not, says the last mentioned author, how the outermost heaven can be called a place, since these philosophers asserting the world to be finite, must grant there is no ambient body without it to contain it; and if the outermost heaven should be impelled by the power of God in a straight line, this or that way, there would ensue a motion without a change of place; for the outermost heaven which

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was in none before, and does not by its progression come to be contained by a new ambient body, and, in this case, even according to the favourers of Aristotle, who approve Des Cartes' definition of local motion, the world may be said to move without changing place; for it does not pass from the neighbourhood of some bodies to that of others; since comprising all bodies, and yet being bounded, there is no body for it to leave behind, nor any beyond for it to approach. See the article MOTION.

Aristotle divides space into external and internal; the first being that already considered, includes or contains the body; and the other, that space or room which the body contains. But Sir Isaac Newton better and more intelligibly distinguishes place into absolute and relative; absolute or primary place being that part of infinite and immoveable space which a body possesses; and relative or secondary place being the space it possesses, considered with regard to the other adjacent bodies.

Optical PLACE, the point to which the eye refers an object.

The optical place of a star is a point of the surface of the mundane sphere, wherein a spectator sees the center of a star. See the article PARALLAX.

PLACE of radiation, is the space in a medium or transparent body through which any visible object radiates.

The place of the sun, star, &c. also denotes the sign and degree of the zodiac which the luminary is in; or the degree of the ecliptic, reckoning from the beginning of aries, which the planet or star's circle of longitude cuts; and therefore coincides with the longitude of the sun, planet, or star. As the sine of the sun's greatest declination $23^{\circ} 30'$; to the sine of any present declination given or observed, for instance, $23^{\circ} 15'$: so is the radius 10: to the sine of his longitude $81^{\circ} 52'$; which, if the declination were north, would give $20^{\circ} 52'$ of gemini; if south $20^{\circ} 52'$ of capricorn for the sun's place. See DECLINATION, &c.

The place of the moon being that part of her orbit wherein she is found at any time, is of various kinds, by reason of the great inequalities of the lunar motions, which render a number of equations and reductions necessary before the just point be found. The moon's fictitious place is her place once equated; her place nearly true, is her place twice

equated; and her true place is her place thrice equated. See the article MOON.

Excentric PLACE of a planet. See the article EXCENTRIC.

Geocentric PLACE of a planet. See the article GEOCENTRIC.

Heliocentric PLACE of a planet. See the article HELIOCENTRIC.

PLACE, in geometry. See LOCUS.

PLACE, in war, a general name for all kinds of fortresses where a party may defend themselves: thus, 1. A strong or fortified place, is one flanked, and covered with bastions. 2. A regular place, one whose angles, sides, bastions, and other parts, are equal; and this is usually denominated from the number of its angles, as a pentagon, hexagon, &c. 3. Irregular place, is one whose sides and angles are unequal. 4. Place of arms, is a strong city or town pitched upon for the chief magazine of an army; or, in a city or garrison, it is a large open spot of ground, usually near the center of the place where the grand guard is commonly kept, and the garrison holds its rendezvous at reviews; and in cases of alarm to receive orders from the governor. 5. Place of arms of an attack, in a siege, is a spacious place covered from the enemy by a parapet or epaulement, where the soldiers are posted ready to sustain those at work in the trenches against the soldiers of the garrison. 6. Place of arms particular, in a garrison, a place near every bastion where the soldiers sent from the grand place to the quarters assigned them, relieve those that are either upon the guard or in fight. 7. Place of arms without, is a place allowed to the covert-way for the planting of cannon, to oblige those who advance in their approaches to retire. 8. Place of arms in a camp, a large place at the head of the camp for the army to be ranged in and drawn up in battalia. There is also a place for each particular body, troop, or company, to assemble in. See the articles CAMP, TROOP, &c.

PLACE, in logic and oratory, denotes the seat or source of an argument, of which there are two kinds, inartificial and artificial; the first is the place of testimony, authority, &c. the second, that of reason, as when we argue from universals, causes, &c.

Common PLACE. See COMMON PLACE.

PLACENTA, in anatomy, a soft roundish mass found in the womb of pregnant women;

women; which from its resemblance to the liver, was called by the antients *hepar uterinum*, the uterine liver.

The number of placentæ in human subjects, answers to that of the fœtuses; and as these are usually single, the placenta is usually so too: but when there are two or more fœtuses, there are always as many placentæ; yet in this case they often cohere together so as to seem but one; but even in this case, their vessels do not communicate from one to the other.

The placenta is about eight or nine inches in diameter, and about an inch in thickness. Its convex and spongy part is connected to the uterus, by means of a very thin and fine membrane, which is reticulated, villose, and continuous with the chorion. Its concave part is turned towards the fœtus, and shews a multitude of very large vessels: it is joined to the navel-string, and surrounded with a smooth membrane from the chorion and amnios. It has no certain part of the uterus to adhere to; but is usually fixed to its bottom. Its substance, according to Ruyſch and Heister, is truly vascular, or composed solely and entirely of the umbilical veins and arteries, interwoven in a very curious manner.

The placenta has generally been looked upon as an original part among the secundines; but according to Dr. Thomas Simson of St. Andrews, it seems to have no place in the ovarium, nor in the uterus, till once the ovum becomes contiguous to the fundus, and then every contiguous part becomes really a placenta. He thinks the fundus uteri a place peculiarly fitted for the growth of the placenta, as proper soils encourage the growth of the roots of trees and shrubs, many of which are propagated by the branches however placed: so that every part of them seems equally fitted to be root or branch. Hence he thinks extra-uterine conceptions can have no placenta; and he says, there are no instances in authors to contradict his opinion. The placenta, according to Dr. Monro of Edinburgh, does not increase in the same proportion which the fœtus does; for the smaller the fœtus is, the placenta is proportionally larger. The placenta generally adheres to, or near, the fundus of the womb, and is covered on the side next to the womb, with a fine membranous continuation of the chorion. The separation of the placenta from the womb must produce abortions, and this

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may be occasioned by different causes operating in various manners, and requires very different treatment to prevent the loss of the fœtus.

The use of the placenta is, together with the chorion, to absorb the nutritious juice from the mother's uterus, as the intestines do the chylé; and finally to transmit it to the fœtus, by means of the umbilical veins. And it probably serves to refund again to the parent, the blood and urine of the fœtus, by the umbilical arteries.

PLACENTA is also a term used, by some botanists, for what is more usually called the receptacle of the seeds. See the article **RECEPTACULUM SEMINUM**.

PLACENTIA, a city of Spain, in the province of Estramadura: west long. 6°, north lat. 39° 45'.

PLACENTIA, a town of Spain, in the province of Guipuscoa, forty miles east of Bilboa.

PLACENTIA, a port-town of Newfoundland, situated on a bay on the south-east part of the island: west long. 56°, north lat. 48°.

PLACENTIA, or **PIACENZA**, a city of Italy, in the duchy of Parma: east long. 10° 25', north lat. 45°.

PLACITA, **PLEAS**, in a law-sense. See the article **PLEA**.

PLACITUM, in law, a sentence of a court, or an opinion, decree, or ordinance.

PLAFOND, or **PLAFOND**, in architecture, the ceiling of a room, whether it be flat or arched, lined with plaster or joiner's work, and frequently enriched with painting.

The word *plafond* is also more particularly used for the bottom of the projection of the larmier of the corniche, called also *soffit*. See the article **SOFFITA**.

PLAGIARY, in philology, the purloining another person's works, and putting them off for a man's own. Among the Romans, *plagiarius* was properly a person who bought, sold, or retained a free-man for a slave; and was so called, because by the Flavian law such persons were condemned, *ad plagas*, to be whipped.

PLAGIURI, among ichthyologists, one of the classes of fishes; comprehending all those which have the tails not perpendicular, but placed in an horizontal direction; and such are all the cetaceous fishes, and they only, as the *physeter*, *dolphin*, *monodon*, *catodon*, and *thricechus*. See **PHYSETER**, &c.

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PLAGUE,

PLAGUE, PESTILENCE, or PESTILENTIAL FEVER, a most acute fever, arising from a poisonous miasma, brought from oriental countries, which, unless it is immediately expelled out of the body, by the strength of the vital motions, by buboes and carbuncles, proves fatal.

In this, as well as in most contagious diseases, says Hoffman, the venomous miasma is swallowed with the air, and insinuates itself into the salival juice; whence it assaults the head, brain, nerves, and animal spirits; producing a torpor in the head, a heaviness, a sleepiness, a violent pain, a stupor of the senses, a forgetfulness, inquietude, watching, and loss of strength. From the fauces it proceeds to the stomach, creating a loathing of food, nausea, anxiety of the precordia, a cardialgia attended with fainting, reaching to vomit, and vomiting itself. Hence it proceeds to the membranes of the spinal marrow, the coats of the arteries, producing horrors, a languid, small, contracted, quick pulse, and even fainting. All which are generally signs and symptoms of the plague, which are of a more violent and quick operation in proportion to the virulence of the pestilential miasma. This disease differs from other contagious, malignant, and eruptive fevers, because it is the most acute, and sometimes kills on the first, and sometimes on the second day. In our climate it is not epidemic or sporadic, from a bad way of living, or an unhealthful air, but happens when it is most salutary, from contagion alone, and is imported from hot countries where this disease rages. It will not only abate by intense cold, but be perfectly extinguished: wherefore in a cold season and very cold countries, it either does not appear at all, or in a very mild degree; whereas if the climate is hot, it is not only most violent, but most common.

All plagues are not of the same nature, but vary according to different constitutions and circumstances; but all who have written of the plague universally agree, that spongy and porous bodies, of an obese habit, of a sanguine and phlegmatico-sanguine constitutions, women, young persons and children, persons of a timid disposition, that are poor, live hard, or are given to luxury, and sit up late at night, are more apt to be afflicted with this disease than the strong and intrepid, lean, nervous, endued with large vessels, men, old persons obnox-

ious to the hæmorrhoidal flux, and who have issues and open ulcers. Nothing brings on this distemper sooner than fear, a dread of death, and a consternation of the mind. If the pestilential poison is not expelled to the external parts, it is certainly fatal; nor is this to be done, according to Hoffman, as in other fevers, by large sweats, by stools, by a flux of urine, by bleeding at the nose, either natural or artificial: for these threaten destruction. The salutary and critical excretion which perfectly solves the pestilential disease, is by tumours in the surface of the body, not otherwise than the erysipelas, between the third and fourth day, and the sooner the better, because then the symptoms are mitigated. That there is poison contained in these tumours appears from hence, that if the surgeon opens any of the tumours with his lancet, and then bleeds a sound man with the same, he will be immediately seized with the plague. The pestilential tumours are of two kinds, the first arises in the glandulous places, most commonly in the groin and arm-pits; sometimes in the parotid and mammary glands, as also the lower maxillary, and in those near the aspera arteria. The description and treatment of these tumours, may be seen under the article *Pestilential BUBO*.

The other sort is the anthrax, or carbuncle, and is already treated of under the article **CARBUNCLE**.

As in the small-pox the management consists in clearing the primæ viæ in the beginning, in regulating the fever, and in promoting the natural discharges; so in the plague, the same indications will take place. When the fever is very acute, a cool regimen is necessary: but when the pulse is languid, and the heat not excessive, moderate cordials must be used. The most gentle emetics may be given; the best is ipecacuhana, if the stomach or bowels are not inflamed, for in that case certain death may be expected. In France they bleed about twelve ounces on the first day, and then four or five ounces every two hours after. This, they say, had extraordinary success with the assistance only of cooling ptisans, and such like drinks, which they gave plentifully at the same time. Sydenham advises, that sweating be continued without intermission. Dr. Mead recommends an infusion of virginia snake-root in boiling water, as the most proper sudorific:

Fig. 1. PLAIN TABLE.

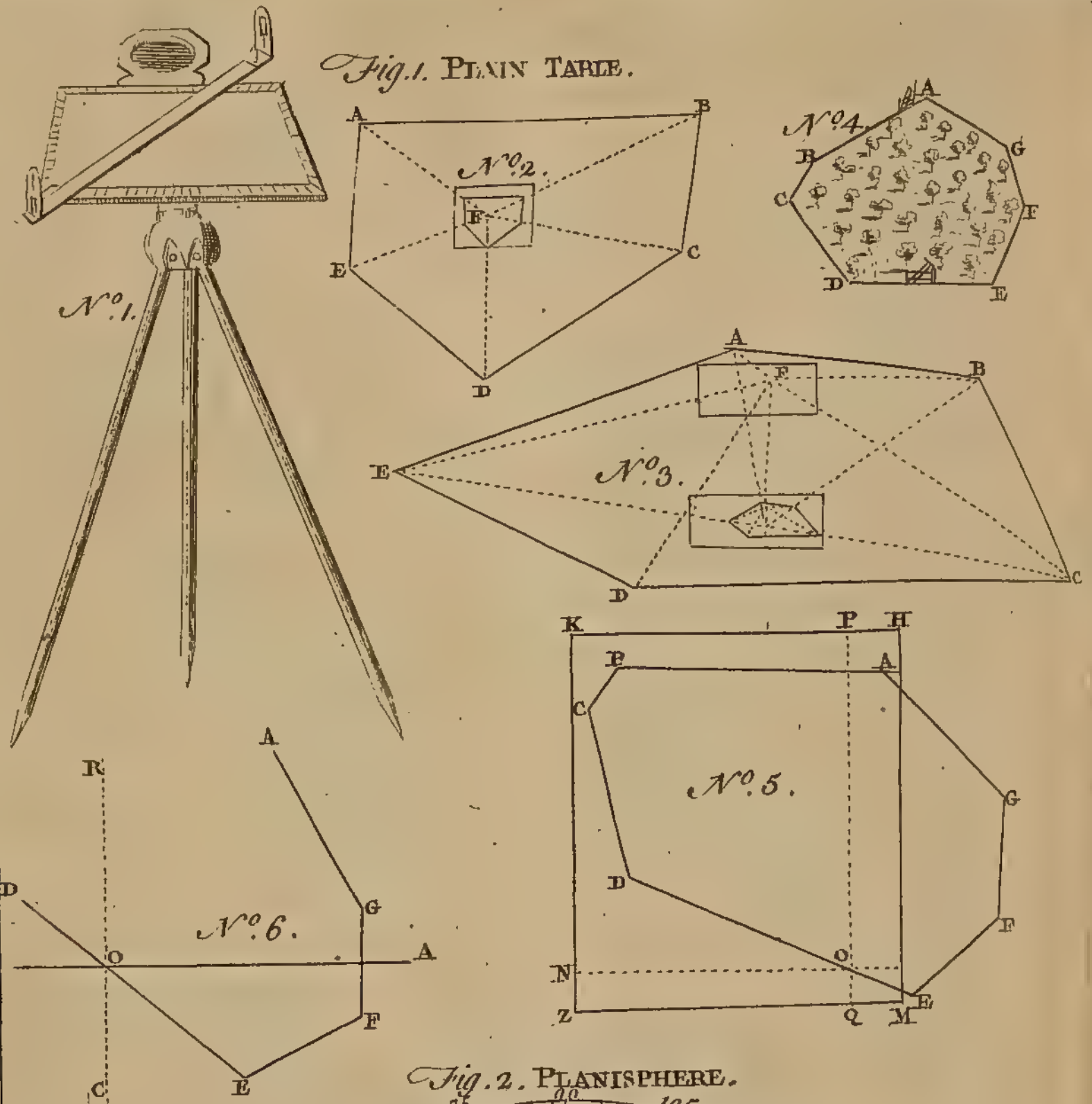


Fig. 2. PLANISPHERE.



dorific : or for want of that, some other warm aromatic, with the addition of about a fourth part of aqua theriacalis. Those who are obliged to be near the sick, must take care that the miasmata do not approach the vital juices, nor yet the salival, to which purpose physicians recommend frequent spitting, and washing the mouth with vinegar or wine, or snuffing them up the nose. The efficacy will be still greater if they are imbued with rue, or citron-rind. It will be likewise proper to get a few spoonfuls of rhenish wine, or bezoardic vinegar diluted with water or wine, and so take them. The Turks deal much in the juice of lemons. Externally many recommend the use of issues, because the matter of the miasma is wont to adhere to the ferous part of the blood, and to be brought by the strength of nature to the place where the issue is made. When the plague is actually begun, and the body is costive, a gentle clyster should be used. Then a sweat should be promoted twenty-four hours at least, that the poison may exhale and pass through the skin; and epithems to the heart will not be without benefit: they may be made of theriac, expressed oil of nutmegs, camphor, saffron, castor, and balsam of Peru. Langius recommends bleeding after sweating: but above all acids are highly praised, such as juice of citrons, Seville-oranges, lemons, vinegar, &c. When the strength of the disease is vanquished, gentle laxatives will be proper to expel the sordes during the course of the disease. Mindererus asserts, that unless alexiterials be given twenty-four hours, all medicines are vain.

PLAGUE-WATER, *aqua epidemica*, one of the compound waters of the shops, distilled from mint, rosemary, angelica-roots, &c.

PLAIN, *planus*, in general, an appellation given to whatever is smooth and even, or simple, obvious, and easy to be understood; and, consequently, stands opposed to rough, enriched, or laboured.

A plain figure, in geometry, is an uniform surface; from every point of whose perimeter, right lines may be drawn to every other point in the same.

A plain angle is one contained under two lines, or surfaces, in contradistinction to a solid angle. See **ANGLE**.

The doctrine of plain triangles, as those included under three right lines, is term-

ed plain trigonometry. See the article **TRIGONOMETRY**.

PLAIN CHART. See the article **CHART**.

PLAIN SAILING. See **NAVIGATION**.

PLAIN SCALE. See the article **SCALE**.

PLAIN TABLE, in surveying, a very simple instrument, whereby the draught of a field is taken on the spot, without any future protraction. It is generally of an oblong rectangular figure, and supported by a fulcrum, so as to turn every way by means of a ball and socket. It has a moveable frame, which serves to hold fast a clean paper; and the sides of this frame, facing the paper, are divided into equal parts every way. It has also a box with a magnetical needle, and a large index with two sights: and, lastly, on the edge of the frame, are marked degrees and minutes, to supply the place of a graphometer. See plate CCIII. fig. 1. n^o 1.

1. To delineate or take the plot of a field *A B C D E* (*ibid.* n^o 2.) by the help of a plain table, from one station whence all its angles may be seen, and their distances measured by a chain. At any convenient place, *F*, let the plain table be erected; cover it with clean paper, in which let some point near the middle represent the station: then applying, at this point, the index and sights, so as to be moveable about it, direct it so as that some mark may be seen at one of the angles of the field, suppose *A*; from the station-point *F*, draw a faint or dotted line along the side of the index; and having measured *F A*, the distance of the station from the foresaid angle, lay it off upon the faint line, by means of a scale of equal parts, and let a mark be made on the paper representing the angle of the field *A*. Keeping the table immoveable, the same is to be done with the rest of the angles; then right lines joining the angular points, so laid off upon the faint lines, shall include a figure exactly like the field, as is evident from Euclid's 5. 6.

2. To lay down the plot of a field by means of the plain table, at two stations, from each of which all the angles can be seen by measuring only the distance of the stations. Let the instrument be placed at the station, *F* (*ibid.* n^o 3.); then having chosen a point representing it on the paper, let the index be applied at this point, so as to be moveable about it; next let the index be directed, successively,

cessively, to the several angles of the field; and when any angle is seen through the sights, draw an obscure or dotted line along the side of the index: and let the index be directed, in this manner, to the station G; and on the obscure line drawn along its side pointing to A, set off from a scale of equal parts a line corresponding to the measured distance of the stations, and this will determine the point G. Then remove the instrument to the station G; and applying the index to the line representing the distance of the stations, place the instrument so that the first station may be seen through the sights; and the instrument remaining immovable, let the index be applied at the point representing the second station G, and be successively directed by means of its sights, to all the angles of the field, drawing (as before) obscure lines along the side of the index; and the intersection of the two obscure lines, drawn to the same angle from the two stations, will always represent that angle on the plan. Care being taken not to mistake these lines for one another, lines joining those intersections will form a figure on the paper like to the field.

3. To take the plot of a wood, park, or the like, by the plain-table, and measuring round the same. Suppose A B C D E F G (*ibid.* n^o 4.) to be the figure you would delineate upon the plain-table. Having put a sheet of paper upon the table, place your instrument at the angle A, and direct your sights to the next angle at B, and by the side thereof draw a line upon your table, as the line A B. Then measure by the hedge-side from the angle A to the angle B, which suppose twelve chains five links. Then from your scale take twelve chains five links, and lay off upon your table from A to B. Then turn the index about, and direct the sights to G, and draw the line A G upon the table: but at present, you need not measure the distance.

Remove your instrument from A, and set up a mark where it last stood, and place your instrument at the second angle B. Then laying the index upon the line A B, turn the whole instrument about, till through the sights you see the mark set up at A, and there screw the instrument. Then laying the index upon the point B, direct your sights to the angle C, and draw the line B C upon your table. Then measuring the distance B C four chains forty-five links, take

that distance from your scale; and set it upon your table from B to C.

Remove your instrument from B, and set up a mark in the room of it, and place your instrument at C, laying the index upon the line C B; and turn the whole instrument about, till through the sights you espy the mark set up at B, and there fasten the instrument. Then laying the index on the point C, direct the sights to D, and draw upon the table the line C D. Then measure from C to D eight chains eighty-five links, and set that distance upon your table from C to D.

Remove the instrument to D, placing a mark at C where it last stood, and lay the index upon the line D C, turning the whole instrument about, till through the sights you see the mark at C, and there fasten the instrument. Then lay the index on the point D, and direct the sights to E, and draw the line D E. Then with your chain measure the distance D E thirteen chains four links, which lay off on the table from D to E.

Remove your instrument to E, placing a mark at D where it last stood; and, laying the index upon the line D E, turn the whole instrument about, till through the sights you see the mark at D, and there fasten the instrument. Then lay the index on the point E, and direct the sights to F, and draw the line E F. Then measure the distance E F seven chains seventy links, which take from your scale, and lay off from E to F.

Remove your instrument to F, placing a mark at E where it last stood, and lay the index upon the line E F, turning the instrument about, till you see the mark set up at E, and there fasten the instrument. Then laying the index on the point F, direct the sights to G, and draw the line F G upon the table, which line F G will cut the line A G in the point G. Then measure the distance F G five chains sixty-seven links, and lay it off from F to G. Remove your instrument to G, setting a mark where it last stood, and lay the index upon the line F G, turning the whole instrument about, till through the sights you see the mark at F, and there fasten the instrument. Then laying the index upon the point G, direct your sights to A (your first mark) and draw the line G A, which if you have truly wrought, will pass directly through the point A, where you first began.

In this manner may you take the plot of any

any champaign plain, be it never so large. And here note, that very often hedges are of such thickness, that you cannot come near the sides or angles of the field, either to place your instrument, or measure the lines. Therefore, in such cases you must place your instrument, or measure your lines parallel to the side thereof; and then your work will be the same as if you measured the hedge itself. Note also, That in thus going about the field, you may much help yourself by the needle. For looking what degree of the card the needle cuts at one station, if you remove your instrument to the next station, and with your sights look to the mark where the instrument last stood, you will find the needle to cut the same degree again, which will give you no small satisfaction in the prosecution of your work. And, though there be a hundred or more sides, the needle will still cut the same degrees at all of them, except you have committed some former error: therefore, at every station have an eye to the needle.

4. Of shifting the paper. In taking the plot of a field by the plain-table, and going about the same, as before directed, it may so fall out, if the field be very large, and when you are to take many inclosures together, that the sheet of paper upon the table will not hold all the work. But you must be forced to take off that sheet, and put another clean sheet in the room thereof: and, in plotting of a manor or lordship, many sheets may be thus changed, which we call shifting of paper. The manner of performing thereof is as follows:

Suppose in going about to take the plot ABCDEFG (*ibid.* n^o 5.) as before directed, that you having made choice of the angle at A for the place of the beginning, and proceed from thence to B, and from B to C, and from C to D, when you come to the angle at D, and are to draw DE, you want room to draw the same upon the table; do thus:

First, through the point D draw the line DO, which is almost so much of the line DE as the table will contain. Then near the edge of the table HM, draw a line parallel to HM, by means of the inches and subdivisions on the opposite sides of the frame, as PQ, and another line at right angles to that through the point O, as ON. This being done, mark this sheet of paper, with the figure (1) about the middle thereof, for the first sheet.

Then taking this sheet off your table, put another clean sheet thereon, and draw upon it a line parallel to the contrary edge of the table, as the line RS (*ibid.* n^o 6.). Then taking your first sheet of paper, lay it upon the table so, that the line PQ may exactly lie upon the line RS, to the best advantage, as at the point O. Then with the point of your compasses draw so much of the line OD upon the clean sheet of paper as the table will hold. Having thus done, proceed with your work upon the new sheet, beginning at the point O; and so going forward with your work, in all respects as has been before directed; as from O to E, from E to F, from F to G, and from G to A; shifting your paper as you have occasion.

PLAIN NUMBER, is a number that may be produced by the multiplication of two numbers into one another: thus 20 is a plain number produced by the multiplication of 5 into 4.

PLAIN PLACE, *locus planus*, or *locus ad planum*, among the antient geometicians, denoted a geometrical locus, when it was a right line or a circle, in opposition to a solid place, which was an ellipsis, parabola, or hyperbola. These the moderns distinguished into loci ad rectam, and loci ad circulum. See **LOCUS**.

PLAIN PROBLEM, in mathematics, is such a problem as cannot be solved geometrically, but by the intersection either of a right line and a circle, or of the circumferences of two circles; as, given the greatest side, and the sum of the other two sides of a right-angled triangle, to find the triangle; as also to describe a trapezium that shall make a given area of four given lines. Such problems can only have two solutions, in regard a right line can only cut a circle, or one circle cut another in two points.

PLAIN, in heraldry, sometimes denotes the point of the shield, when coupéd square; a part remaining under the square, of a different colour or metal from the shield. This has been sometimes used as a mark of bastardy, and called champaigne; for, when the legitimate descendants of bastards have taken away the bar, fillet, or traverse borne by their fathers, they are to cut the point of the shield with a different colour called plain.

PLAINT, in law, the exhibiting any action, real or personal, in writing. See the article **ACTION**.

PLAISE, the english name of a species of the

the pleuronectes, with smooth sides, a spine near the anus, and the eyes and six tubercles placed on the right side of the head: it is somewhat larger than the flounder. See PLEURONECTES.

PLAISTER, or PLASTER. See the article PLASTER.

PLAN, in general, denotes the representation of something drawn on a plane: such are maps, charts, ichnographies, &c. See the articles MAP, CHART, &c.

The term plan, however, is particularly used for a draught of a building, such as it appears, or is intended to appear, on the ground; shewing the extent, division, and distribution of its area, or ground-plot, into apartments, rooms, passages, &c. See BUILDING.

A geometrical plan is that, wherein the solid and vacant parts are represented in their natural proportions.

The raised plan of a building, is the same with what is otherwise called an elevation, or orthography. See the article ORTHOGRAPHY.

A perspective plan, is that exhibited by degradations, or diminutions, according to the rules of perspective. See the article PERSPECTIVE.

To render plans intelligible, it is usual to distinguish the massives, with a black wash; the projectures on the ground, are drawn in full lines, and those supposed over them in dotted lines. The augmentations, or alterations, to be made, are distinguished by a colour different from what is already built; and the tints of each plan made lighter, as the stories are raised.

In large buildings, it is usual to have three several plans, for the three first stories.

PLANCHIER, or PLANCERE, in architecture, the under part of the corona, or drip, making the superior part of the cornice, between two cymatiums. See CORNICHE and CYMATIUM.

PLANE, *planum*, in geometry, denotes a plain surface, or one that lies evenly between its bounding lines: and as a right line is the shortest extension from one point to another, so a plain surface is the shortest extension from one line to another.

In astronomy, conics, &c. the term plane, is frequently used for an imaginary surface, supposed to cut and pass through solid bodies; and on this foundation, is the whole doctrine of conic sections built. See CONIC SECTIONS.

For the inclination of the planes of the

orbits of the planets, see the articles ORBIT, INCLINATION and PLANET. In mechanics, planes are either horizontal, that is, parallel to the horizon, or inclined thereto. See the articles HORIZON, and INCLINED PLANE.

The determining how far any given plane, deviates from an horizontal one, makes the whole business of levelling. See the article LEVELLING.

In optics, the planes of reflection and refraction, are those drawn through the incident and reflected or refracted rays. See the articles INCIDENCE, REFLECTION, and REFRACTION.

The plane of the horopter, is that drawn through the horopter, perpendicularly to the plane of the two optical axes. See the article HOROPTER.

In perspective, we meet with the perspective plane, which is supposed to be pellucid, and perpendicular to the horizon; the horizontal plane, supposed to pass through the spectator's eye, parallel to the horizon; the geometrical plane, likewise parallel to the horizon, whereon the object to be represented is supposed to be placed, &c. See PERSPECTIVE.

The plane of projection, in the stereographic projection of the sphere, is that on which the projection is made; corresponding to the perspective plane. See the articles MAP and PROJECTION.

For the inclination and declination of planes, see the articles INCLINATION and DECLINATION.

PLANE, in joinery, an edged tool, or instrument for parting and shaving of wood smooth. See plate of JOINERY.

It consists of a piece of wood, very smooth at bottom, as a stock or shaft; in the middle of which is an aperture, through which a steel-edge, or chissel, placed obliquely, passes, which being very sharp, takes off the inequalities of the wood it is slid along.

Planes have various names, according to their various forms, sizes, and uses: as, 1. The fore-plane, which is a very long one, and is usually that which is first used: the edge of its iron or chissel is not ground straight, but rises with a convex arch in the middle; its use is to take off the greater irregularities of the stuff, and to prepare it for the smoothing-plane. 2. The smoothing-plane is short and small, its chissel being finer: its use is to take off the greater irregularities left by the fore-plane, and to prepare the wood for the jointer. 3. The jointer is the

the longest of all; its edge is very fine, and does not stand out above an hair's breadth: it is chiefly used for shooting the edge of a board perfectly straight, for jointing tables, &c. 4. The strike-block, which is like the jointer, but shorter: its use is to shoot short joints. 5. The rabbit-plane, which is used in cutting the upper edge of a board, straight or square, down into the stuff, so that the edge of another cut after the same manner, may join in with it, on the square; it is also used in striking facias on mouldings: the iron or chissel of this plane is as broad as its stock, that the angle may cut straight, and it delivers its shavings at the sides, and not at the top, like the others. 6. The plough, which is a narrow rabbit-plane, with the addition of two staves, on which are shoulders: its use is to plow a narrow square groove on the edge of a board. 7. Moulding-plane, which are of various kinds, accommodated to the various forms and profiles of the moulding; as the round-plane, the hollow-plane, the ogee, the snipe's bill, &c. which are all of several sizes from half an inch, to an inch and a half.

PLANE-TREE, *platanus*, in botany, a genus of the monoecia-polyandria class of plants, the male corolla whereof is scarce visible: the female one consists of several concave, oblong, and clavated petals: there is no pericarpium, several of the fruits constituting a round, rough ball; the seed, which stands upon a fetaceous style, is roundish, and is terminated by a subulated style, and there is a capillary down adhering to its base.

This tree grows to a very considerable size, and is ramose and spreading; the bark is smooth; the wood firm, and pale-coloured; and the leaves are very large, of a palmated figure, and divided into six or seven parts at the edge.

PLANET, *planeta*, *πλανήτης*, a celestial body, revolving round the sun as a center, and continually changing its position, with respect to the fixed stars; whence the name planet, which is a greek word, signifying wanderer.

The planets are usually distinguished into primary, and secondary. The primary ones, called, by way of eminence, planets, are those which revolve round the sun as a center; and the secondary planets, more usually called satellites, or moons, are those which revolve round a

primary planet as a center, and constantly attend it in its revolution round the sun. See **SATELLITE**, and **MOON**. The primary planets are again distinguished into superior and inferior. The superior planets, are those further from the sun than our earth; as mars, jupiter, and saturn: and the inferior planets, are those nearer the sun than our earth, as venus and mercury; for the astronomy, and other peculiarities, of which, see **MARS**, **JUPITER**, &c.

Nature of the PLANETS. That the planets are opaque bodies, like our earth, appears evident for the following reasons. 1. Since in venus, mercury, and mars, only that part of the disk illuminated by the sun, is found to shine; and, again, venus and mercury, when between the earth and the sun, appear like dark spots or maculæ, on the sun's disk; it is evident, that mars, venus, and mercury are opaque bodies, illuminated with the borrowed light of the sun. And the same appears of jupiter, from its being void of light in that part to which the shadow of the satellites reaches, as well as in that part turned from the sun; and that his satellites are opaque, and reflect the sun's light, is abundantly shewn. Wherefore, since saturn, with his ring and satellites, only yield a faint light, fainter considerably than that of the fixed stars, though these be vastly more remote; and than that of the rest of the planets: it is past doubt, he too, with his attendants, are opaque bodies. 2. Since the sun's light is not transmitted through mercury and venus, when placed against him, it is plain they are dense opaque bodies; which is likewise evident of jupiter, from his hiding the satellites in his shadow; and therefore, by analogy, the same may be concluded of saturn. 3. From the variable spots in venus, mars, and jupiter, it is evident these planets have a changeable atmosphere; which changeable atmosphere may, by a like argument, be inferred of the satellites of jupiter, and therefore by similitude the same may be concluded of the other planets. 4. In like manner, from the mountains observed in venus, the same may be supposed in the other planets. 5. Since then, saturn, jupiter, both their satellites, mars, venus, and mercury, are opaque bodies, shining with the sun's borrowed light, are furnished with mountains, and encompassed with a changeable atmosphere; they have, of conse-

consequence, waters, seas, &c. as well as dry land, and are bodies like the moon, and therefore like the earth.
Q. E. D.

And hence, it seems highly probable, that the other planets have their animal inhabitants, as well as our earth.

Motion of the PLANETS. Each of the primary planets bend their course about the center of the sun, and are accelerated in their motions as they approach to him, and retarded as they recede from him; so that a ray, drawn from any one of them to the sun, always describes equal spaces, or areas, in equal times: whence it follows, that the power which bends their way into a curve line, must be directed to the sun. This power is no other than that of gravitation, which we have already proved to increase, as the square of the planet's distance from the sun decreases. See the articles GRAVITATION, ORBIT, &c.

But the universality of this law still farther appears, by comparing the motions of the different planets: for the power which acts on a planet near the sun, is manifestly greater than that which acts on a planet more remote; both because it moves with greater velocity, and because it moves in a lesser orbit, which has more curvature, and separates farther from its tangent, in arcs of the same length, than in a greater orbit. By comparing the motion of the planets, the velocity of a nearer planet is found to be greater than that of one more remote, in the proportion of the square-root of the number which expresses the greater distance, to the square-root of that which expresses the lesser distance; so that if one planet was four times farther from the sun than another, the velocity of the first would be half the velocity of the latter; and the nearer planet would describe an arc in one minute, equal to the arc described by the other planet in two minutes: and tho' the curvature of the orbits was the same, the nearer planet would describe, by its gravity, four times as much space, as the other would describe in the same time; so that the gravity of the nearer planet would appear to be quadruple, from the consideration of its greater velocity only. But besides this, as the radius of the lesser orbit is supposed to be four times less than the radius of the other, the lesser orbit must be four times more curve; and the extremity of a small arc, of the

same length, will be four times farther below the tangent, drawn at the other extremity, in the lesser orbit than in the greater; so that, though the velocities were equal, the gravity of the nearer planet would, on this account only, be found to be quadruple. Hence, on both these accounts together, the greater velocity of the nearer planet, and the greater curvature of its orbit, its gravity towards the sun must be supposed sixteen times greater, though its distance from the sun is only four times less than that of the other; that is, when the distances are as 1 to 4, the gravities are reciprocally as the squares of these numbers, or as 16 to 1.

And in the same manner as this principle governs the motions of the primary planets of the great solar system, acts at their surfaces, and keeps their parts together; so it governs also the motions of the satellites, or secondary planets, in the lesser systems of which the greater is composed, and is extended around them, decreasing in the same manner as the squares of the distances increase. Nay the comets seem evidently to be governed by the same law, since they descend with an accelerated motion, as they approach towards the sun, and ascend again with a retarded motion, bending their way about the sun, and describing equal areas in equal times, by rays drawn from them to his center.

For the various systems that have been formed concerning the planets, see the articles COPERNICAN, PTOLEMAIC, TYCHONIC, &c.

And as to their distances, diameters, orbits, inclination of their orbits, &c. they will be found under the articles DISTANCE, DIAMETER, ORBIT, INCLINATION, &c.

PLANETARIUM, an astronomical machine, so called from its representing the motions, orbits, &c. of the planets, agreeably to the copernican system. See the article COPERNICAN.

The planetarium is more generally known by the name orrery, and therefore we have given its description and use under that article. See ORRERY.

PLANETARY, something relating to the planets. See the article PLANET.

Thus we meet with planetary days, hours, years, systems, &c. See the articles DAY, HOUR, &c.

PLANIMETRY, that part of geometry which

which considers lines and plain figures, without considering their height or depth. See the articles TRIANGLE, SQUARE, SURVEYING, &c.

PLANISPHERE, signifies a projection of the sphere, and its various circles on a plane; in which sense maps, wherein are exhibited the meridians, and other circles of the sphere, are planispheres. See the articles MAP, PROJECTION, CIRCLE, SPHERE, &c.

PLANISPHERE, is more particularly used for an astronomical instrument used in observing the motions of the heavenly bodies.

It consists of a projection of the celestial sphere upon a plane, representing the stars, constellations, &c. in their proper order; some being projected on the meridian, and others on the equator.

Among all these planispheres, that of M. Cassini seems to deserve the preference: it is composed of two circular, but unequal plates, A and B (plate CCIII. fig. 2.) whereof the least, B, is so fitted within the other, as to turn round upon the center, whilst the larger circle, A, remains immoveable. On the lesser plate are delineated the constellations of the northern hemisphere, with its several circles. The limb of the inferior plate, A, is divided into three hundred and sixty degrees, and into twenty-four hours, which are reckoned from twelve to twelve, and each hour into sixty minutes. Between the two opposite hours, twelve and twelve, is extended a silver-thread, which passing over the center, or northern pole, represents the meridian. If then the south point be turned towards the observer, the semi-circle towards the left hand will be the east, and that on the right the west; and the hours on the former will be those of the forenoon, and the hours on the latter those of the afternoon.

Use of the PLANISPHERE. 1. To represent the face of the heavens for any day and hour: find, on the lesser moveable plate, the month and day proposed, and turn the plate till the given day of the month stand against the hour and minute required; and the plate will then represent the face of the heavens, by shewing what stars are then rising in the meridian, or what setting. 2. To know at what hour and minute any star rises or sets, &c. Turn the moveable plate, till the given star reaches the horizon, east or west, and against the given day, on the

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moveable plate, is the hour and minute on the exterior or immoveable one: and in the same manner may most of the problems, usually resolved by the celestial globe, be determined.

Nautical PLANISPHERE. See the article NAUTICAL.

PLANO-CONCAVE, and PLANO-CONVEX-LENSES. See the article LENS.

PLANT, *planta*, is defined to be an organical body, destitute of sense and spontaneous motion, adhering to another body in such a manner as to draw from it its nourishment, and having power of propagating itself by seeds.

As to the parts of which a plant consists, they are the root, stalk, leaf, flower, and fruit. See ROOT, STALK, &c.

Plant and vegetable are pretty near terms synonymous, every plant being a vegetable. Now Dr. Boerhaave defines a vegetable to be a body generated of the earth, or something arising out of the earth, to which it adheres, or is connected, by parts called roots, through which it receives the matter of its nourishment and increase; and consists of juices and vessels sensibly distinct from each other: or, a vegetable is an organical body, composed of vessels and juices every where distinguishable from each other; to which body grow roots or parts, whereto it adheres, and from which it derives the matter of its life and growth.

This definition furnishes a just and adequate idea of a vegetable; for by its consisting of distinct vessels and juices, it is distinguished from a fossil; and by its adhering to another body, from which it derives its nourishment, and being destitute of sensation, it is sufficiently distinguished from an animal. See the articles FOSSIL and ANIMAL.

The vessels, or containing parts of plants, consist chiefly of earth, bound or connected together by oil, as a gluten; which being exhausted by fire, air, age, or the like, the plant moulders, or returns again into its earth or dust: but it must be owned, that water, air, salt, and sulphur or oil, are likewise constituent parts of plants, since they can be all obtained by a well managed analysis. See AIR, WATER, SALT, &c.

The root, or part whereby plants are connected to their matrix; and by which they receive their nutritious juice, consists of an infinite number of absorbent vessels, which being dispersed through the interstices of the earth, attract or imbibe the

juices

juices of the same; consequently, every thing in the earth that is dissoluble in water, is liable to be imbibed, as air, salt, oil, and fumes of minerals, metals, &c. and of these plants do really consist.

The motion of these nutritious juices is not unlike that of the blood in animals, being effected by the action of the air. The discovery of this we owe to the admirable Malpighi, who first observed, that plants consist of two series or orders of vessels: 1. Such as receive and distribute the alimentary juices, answering to the arteries, lacteals, veins, &c. of animals. 2. The tracheæ, or air-vessels, which are long hollow pipes, wherein air is commonly received and expelled; that is, inspired and expired. Hence it follows, that the heat of the sun must have a strong effect on the air included in these tracheæ; whence arises a perpetual spring of action, to promote the circulation of the juices in plants.

For the botanical distribution of plants into classes, genera, &c. see the articles BOTANY, GENUS, &c.

And as to the elements, or constituent parts of plants, they will be found under the articles ELEMENT, OIL, SALT, &c.

Parasitical PLANTS. See PARASITES.

Sensitive PLANT. See SENSITIVE.

Fossil PLANTS, those found buried in the earth, and lodged in almost all the kinds of strata, or substances; to be met with there. See plate CCIV.

The most frequent fossil plants are the polypody, spleenwort, osmund, trichomanes, and the several larger and smaller ferns; but beside these there are also found pieces of the equisetums, or horsetails, and joints of the stellated plants, as the clivers, madder, and the like; and these have been too often mistaken for flowers. Sometimes there are also found complete grasses, or parts of them; as also reeds and other water-plants; sometimes the ears of corn, and not unfrequently the twigs or bark, and impressions of the bark, and fruit of the pine or fir-kind, which have been, from their scaly appearance, mistaken for the skins of fishes; and sometimes, but that very rarely, we meet with mosses and sea-plants.

Many of the ferns, not unfrequently found, are of very singular kinds, and some species yet unknown to us; and the leaves of some appear set at regular

distances, with round protuberances and cavities. The stones which contain these plants split readily, and are often found to contain, on one side, the impression of the plants; and on the other the prominent plant itself: and beside all that have been mentioned, there have been frequently supposed to be found with us ears of common wheat, and of the maize or indian corn; the first being in reality no other than the common endmost branches of the firs; and the other the thicker boughs of various species of that and of the pine-kind, with their leaves fallen off; such branches, in such a state, cannot but afford many irregular tubercles and papillæ, and in some species, such as are more regularly disposed.

These are the kinds most obvious in England; and these are either immersed in the slaty stone which constitutes the whole strata, or in flatted nodules, usually of about three inches broad, which readily split into two pieces on being struck.

Though these seem the only species of plants found with us, yet in Germany there are many others, and those found in different substances. A whitish stone, a little harder than chalk, frequently contains them: they are found also often in a grey slaty stone, of a firmer texture; not unfrequently in a blackish one; and, at times, in many others. Nor are the bodies themselves less various here than the matter in which they are contained: the leaves of trees are found in great abundance, among which those of the willow, poplar, whitethorn, and pear-trees, are the most common; small branches of box, leaves of the olive tree, and stalks of garden-thyme, are also found there; and sometimes ears of the various species of corn, and the larger as well as the smaller mosses in great abundance.

These seem the tender vegetables, or herbaceous plants, certainly found thus immersed in hard stone, and buried at great depths in the earth; others of many kinds there are also named by authors, but as in bodies so imperfect, errors are easily fallen into, these seem all that can be ascertained beyond mere conjecture.

PLANTA, in anatomy, the sole of the foot. See the article FOOT.

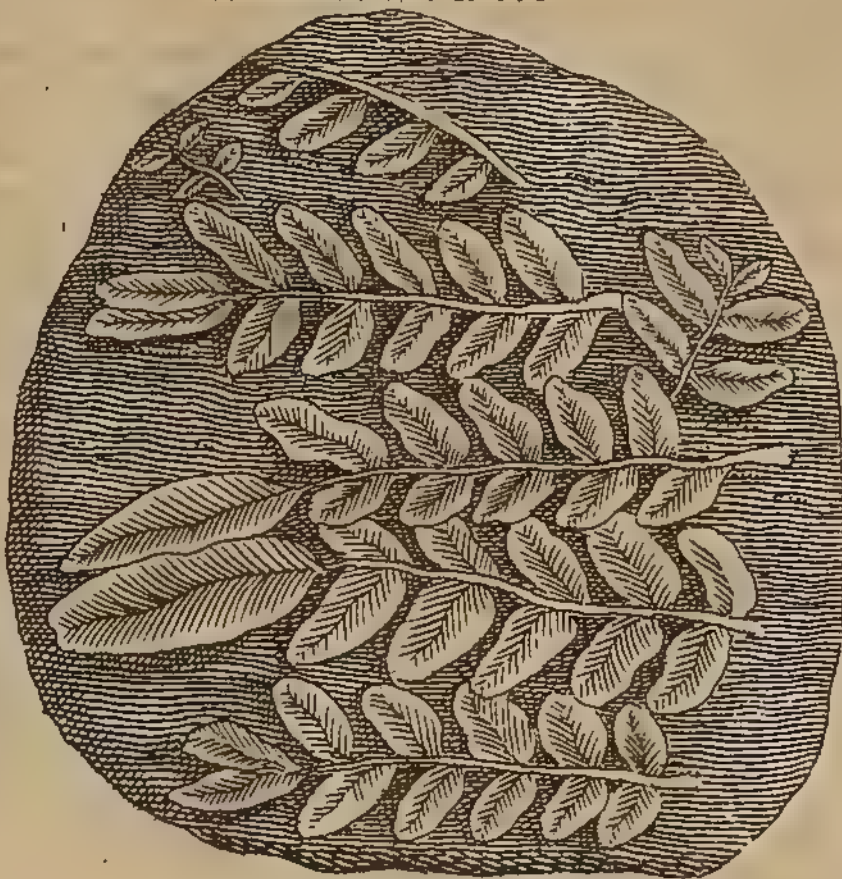
PLANTAGO, the PLANTAIN TREE, in botany. See the next article.

PLANTAIN, *plantago*, in botany, a plant

An Equisetum



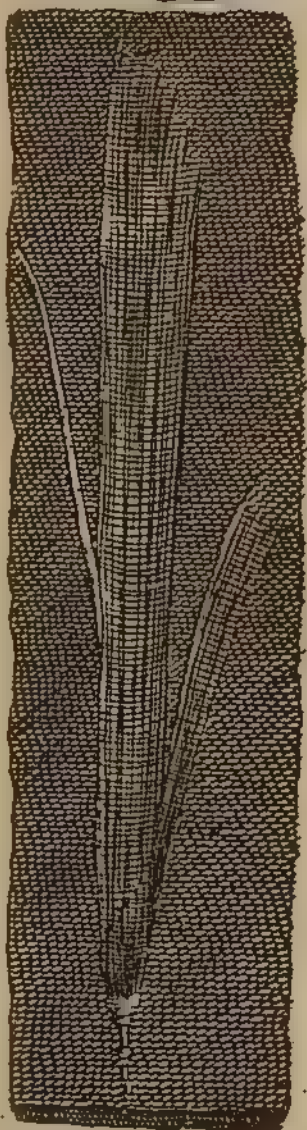
An American Fern



A Stellate Plant and Fern



*An Ear
of Corn*



Leaves encrusted with Spar



Moss



plant of the tetrandria monogynia class, the flower whereof consists of one petal, usually wide expanded at the mouth, and with the limb divided into four oval segments: the fruit is a bilocular capsule, of an ovated figure, containing a great many oblong seeds.

The root, leaves, and seeds of plantain, are used in medicine, and reckoned cooling and astringent; being much recommended in fluxes of all kinds, particularly hæmorrhages, whether from the nose, mouth, or uterus. It is likewise accounted a great healer of fresh wounds. Ribwort, and bucks-horn plantain, are two species of, and agree with, plantain in virtues.

Water-PLANTAIN, ranunculus. See the article RANUNCULUS.

PLANTARIS, in anatomy, one of the extensor-muscles of the foot, which has its origin from the interior part of the external condyle.

PLANTATION, in the West-Indies, denotes a spot of ground which a planter or person, arrived in a new colony, pitches on to cultivate for his own use, or is assigned for that purpose. However, the term plantation is often used in a synonymous sense with colony. See the article COLONY.

The british plantations in America, are, besides the islands of Jamaica, Barbadoes, &c. those of Virginia, Maryland, New-England, New-York, Carolina, Georgia, Pennsylvania, New-Scotland, &c. See VIRGINIA, &c.

By stat. 12 Car. II. and 11 and 12 Will. III. all governors of the plantations are, at their entrance, to take an oath, that, to their utmost, they shall see the acts of parliament made concerning the said colonies put in execution; and on failure, complaint being made to the king, such a governor is to be removed, and forfeit the sum of one thousand pounds. If any governor, deputy-governor, &c. oppress any of the king's subjects under their government, or act any ways contrary to the laws of this realm, or in force within their governments, &c. it shall be determined in the court of king's bench in England, and the same punishment inflicted as usual for such offences in England.

And by 7 and 8 Will. III. all laws, customs, &c. practised in any of the plantations that are repugnant to any laws already made, or to any law hereafter to be made, relating to those plan-

tations, are declared null and void. And all places of trust in the courts of law, or relating to the treasury, in any island or colony, shall be held by native-born subjects of Great-Britain, Ireland, or of the said colonies. Also all persons, claiming any right in any of them, shall not dispose of the same to any but natural born subjects; and all governors appointed by such proprietors, shall be approved by his majesty, and take the oaths accordingly.

By 5 Geo. II. c. 7. all real estates in the plantations shall be chargeable with all just debts whatsoever, and subject to the like remedies and proceedings as in England. And for the more easy recovery of debts in the colonies, in which any person residing in Great-Britain shall be party, such debt may be proved. Here an oath before any chief magistrate near where the person shall reside; and being certified under the common seal of the city or town, shall be of the same force as if the person had appeared in open court, or upon commission.

By 6 Geo. II. c. 13. all sugars and panes of the product of any plantation not under his majesty's dominion, imported into any of his majesty's plantations, shall pay five shillings for every hundred weight; and for all rum, or spirits of foreign produce, nine pence per gallon; and for molasses, six pence per gallon. And, on importation, an entry shall be made by the proper officers, &c. and the duties paid down in ready money before landing the goods, on pain of forfeiture. And by the same act, sugars, rum, &c. not the produce of british plantations, are prohibited to be imported into Ireland.

By 5 Geo. II. c. 22. no hats or felts shall be exported from one british plantation to another, on penalty of five hundred pounds and forfeiture of the goods; and persons aiding and assisting therein, shall forfeit forty pounds. This statute also regulates the trade of felt-making, &c. and no person shall retain in the said art any negro, on forfeiture of five pounds for every month.

For other regulations concerning the british plantations and the trade to and from them, see NAVAL AFFAIRS.

By a proclamation of queen Anne's, the currency of the foreign coins, in the plantations, was settled as follows: Seville pieces of eight, old plate, seventeen penny-weight twelve grains, at

four shillings and sixpence; Seville pieces of eight, new plate, fourteen penny weight, at three shillings and seven pence farthing; Mexico pieces of eight, seventeen penny-weight twelve grains, at four shillings and six pence, pillar pieces of eight, seventeen penny-weight, twelve grains, at four shillings and six pence three farthings; Peru pieces of eight, old plate, seventeen penny-weight twelve grains, at four shillings and five pence; cross-dollars, eighteen penny-weight, at four shillings and four pence three farthings; ducatoons of Flanders, twenty penny-weight and twenty-one grains at five shillings and six pence; ecus, or crowns of France, seventeen penny-weight twelve grains, at four shillings and six pence; crusadoes of Portugal, eleven penny-weight four grains, at two shillings and ten pence farthing; three guilder pieces of Holland, twenty penny-weight and seven grains, at five shillings and two pence farthing; old rix-dollars of the empire, eighteen penny-weight and ten grains, at four shillings and six pence; and the halves, quarters, and other parts in proportion to their denominations, and light pieces in proportion to their weight.

Strength of the british PLANTATIONS. The encroachments of the French upon the british plantations, the number of whose inhabitants is more than three times that of French both in Canada and Louisiana put together, is certainly a very great indignity offered to his majesty and the nation; especially since the English planted and improved them, from the sea-coasts almost up to the sources of the largest rivers, by the consent of the natives, whose lands they have actually purchased and paid for; and whose traffic we may be entirely deprived of, if the French do not meet with an effectual check; which, could proper measures be taken to make the several colonies of New England, New York, New Jersey, Pensilvania, Maryland, Virginia, and North and South Carolina act in concert, may very easily be done: but the mischief is, all these colonies are independent on each other, and have different views and interests; which makes it next to impossible to draw any considerable body of forces together on an emergency, though the safety and preservation, not only of any particular colony, but of all the british plantations on the american continent, were ever so nearly concerned.

To remedy this inconvenience, some have, with the utmost deference to his majesty and his ministers, proposed, that all the colonies appertaining to the crown of Great Britain on the northern continent of America, be united under a legal, regular, and firm establishment; and that a lieutenant-general be appointed, to whom the governors of each province shall be subordinate; also that an assembly composed of a certain number of deputies from each province, shall have power to settle and appoint what quotas or proportions of men, money, &c. each province is to raise for their mutual defence; and if necessary, for offence and invasion of their enemies; in all which cases, the lieutenant or governor general is to have a negative, but not to enact any thing without the concurrence of the majority of them. Such a coalition, tempered with, and founded on prudence, moderation and justice, could not fail to lay a lasting and sure foundation of such strength and prosperity, as would enable the plantations to defend themselves against their enterprising and ambitious neighbours.

PLANTING, in agriculture and gardening, is setting a tree or plant taken from its proper place, in a new hole or pit; throwing fresh earth over its root, and filling up the hole to the level of the surface of the ground.

The first thing in planting is to prepare the ground before the trees or plants are taken out of the earth, that they may remain out of the ground, as short a time as possible, and the next is to take up the trees or plants in order to their being transplanted. In taking up the trees, carefully dig away the earth round the roots, so as to come at their several parts to cut them off; for if they are torn out of the ground without care, the roots will be broken and bruised to the great injury of the trees. When you have taken them up, the next thing is to prepare them for planting by pruning the roots and heads. And first, as to the roots; all the small fibres are to be cut off, as near to the place from whence they are produced, as may be, except they are to be replanted immediately after they are taken up. Then prune off all the bruised or broken roots, all such as are irregular, and cross each other, and all downright roots, especially in fruit-trees: shorten the larger roots in proportion to the age, the strength, and nature

nature of the trees; observing that the walnut, mulberry, and some other tender-rooted kinds should not be pruned so close as the more hardy sorts of fruit and forest-trees: in young fruit trees, such as pears, apples, plumbs, peaches, &c. that are one year old from the time of their budding or grafting, the roots may be left only about eight or nine inches long; but in older trees, they must be left of a much greater length: but this is only to be understood of the larger roots; for the small ones must be chiefly cut quite out, or pruned very short. The next thing is the pruning of their heads, which must be differently performed in different trees; and the design of the trees must also be considered: thus, if they are designed for walls or espaliers, it is best to plant them with the greatest part of their heads, which should remain on till they begin to shoot in the spring, when they must be cut down to five or six eyes, at the same time taking care not to disturb the roots. But if the trees are designed for standards, you should prune off all the small branches close to the place where they are produced, as also the irregular ones which cross each other; and after having displaced these branches, you should also cut off all such parts of branches, as have by any accident been broken or wounded; but by no means cut off the main leading shoots which are necessary to attract the sap from the root, and thereby promote the growth of the tree. Having thus prepared the trees for planting, you must now proceed to place them in the earth; but first if the trees have been long out of the ground, so that the fibres of the roots are dried, place them eight or ten hours in water, before they are planted, with their heads erect, and the roots only immersed therein, which will swell the dried vessels of the roots, and prepare them to imbibe nourishment from the earth. In planting them, great regard should be had to the nature of the soil; for if that be cold and moist, the trees should be planted very shallow; and if it be a hard rock or gravel, it will be better to raise a hill of earth where each tree is to be planted, than to dig into the rock or gravel, and fill it up with earth, as is too often practised, by which means the trees are planted, as it were in a tub, and have but little room to extend their roots. The next thing to be observed is, to place the

trees in the hole in such a manner that the roots may be about the same depth in the ground, as before they were taken up: then break the earth fine with a spade, and scatter it into the hole, so that it may fall in between every root, that there may be no hollows in the earth: then having filled up the hole, gently tread down the earth with your feet, but do not make it too hard; which is a great fault, especially if the ground be strong or wet. Having thus planted the trees, they should be fastened to stakes driven into the ground, to prevent their being displaced by the wind, and some mulch laid about the surface of the ground about their roots: as to such as are planted against walls, their roots should be placed about five or six inches from the wall, to which their heads should be nailed to prevent their being blown up by the wind. The seasons for planting are various, according to the different sorts of trees, or the soil in which they are planted: for the trees whose leaves fall off in winter, the best time is the beginning of October, provided the soil be dry; but if it be a very wet soil it is better to defer it till the latter end of February, or the beginning of March; and for many kinds of evergreens, the beginning of April is by far the best season; though they may be safely removed at Midsummer, provided they are not to be carried very far; but you should always make choice of a cloudy wet season.

For other observations on planting, see the articles NURSERY, KITCHEN-GARDEN, ORCHARD, GROVE, &c.

Reverse PLANTING, a method of planting in which the natural position of the plant, or shoot is inverted; the branches being set into the earth, and the root reared into the air. Dr. Agricola mentions this monstrous method of planting, which he found to succeed very well, in most or all sorts of fruit trees, timber trees, &c. Bradley affirms that he has seen a lime tree in Holland growing with its first roots in the air, which had shot out branches in great plenty, at the same time that its first branches produced roots and fed the tree. Mr. Fairchild, of Hoxton, has practised the same with us, and gives the following directions for performing it: make choice of a young tree of one shoot, of alder, elm, willow, or any other tree that easily takes root by laying; bend the shoot gently down into the earth, and so let it remain till it has taken

taken root. Then dig about the first root, and raise it gently out of the ground, till the stem be nearly upright, and stake it up. Then prune the roots, now erected in the air, from the bruises and wounds they received in being dug up, and anoint the pruned parts with a composition of two ounces of turpentine, four ounces of tallow, and four ounces of bees wax melted together and applied pretty warm. Afterwards prune off all the buds or shoots that are upon the stem, and dress the wounds with the same composition, to prevent any collateral shootings, that might spoil the beauty of the stem.

PLANTING, in architecture, the laying the first course of stones, in the foundations of buildings. See **FOUNDATION**.

PLASENDAL, a fortress of Flanders, three miles south-east of Ostend.

PLASHING of *quickset-hedges*, an operation very necessary to promote the growth and continuance of old hedges. See the article **HEDGE**.

It is performed in this manner: the old stubs must be cut off, &c. within two or three inches of the ground, and the best and longest of the middle sized shoots must be left to lay down. Some of the strongest of these must also be left to answer the purpose of stakes. These are to be cut off to the height at which the hedge is intended to be left; and they are to stand at ten foot distance one from another: when there are not proper shoots for these at the due distances, their places must be supplied with common stakes of dead wood. The hedges is to be first thinned, by cutting away all but those shoots which are intended to be used either as stakes, or the other work of the plashing; the ditch is to be cleaned out with the spade: and it must be now dug as at first, with sloping sides each way; and when there is any cavity on the bank on which the hedge grows, or the earth has been washed away from the roots of the shrubs, it is to be made good by facing it, as they express it, with the mould dug from the upper part of the ditch: all the rest of the earth dug out of the ditch is to be laid upon the top of the bank, and the owner should look carefully into it that this be done; for the workmen, to spare themselves trouble, are apt to throw as much as they can upon the face of the bank; which being by this means overloaded, is soon washed off into the ditch again, and a very

great part of the work undone; whereas what is laid on the top of the bank always remains there, and makes a good fence of an indifferent hedge.

In the plashing the quick, two extremes are to be avoided; these are, the laying it too low, and the laying it too thick: this makes the sap run all into the shoots, and leaves the plashes without sufficient nourishment; which, with the thickness of the hedge, finally kills them. The other extreme of laying them too high, is equally to be avoided; for this carries up all the nourishment into the plashes, and so makes the shoots small and weak at the bottom, and, consequently, the hedge thin. This is a common error in the north of England. The best hedges made any where in England, are those in Hertfordshire; for they are plashed in a middle way between the two extremes, and the cattle are by that prevented both from cropping the young shoots, and from going through; and a new and vigorous hedge soon forms itself. When the shoot is bent down that is intended to be plashed, it must be cut half way through with the bill: the cut must be given sloping, somewhat downwards, and then it is to be wounded about the stakes, and after this its superfluous branches are to be cut off, as they stand out at the sides of the hedge. If for the first year or two the field where a new hedge is made can be ploughed, it will thrive the better for it; but if the stubs are very old, it is best to cut them quite down, and to secure them with good dead hedges on both sides, till the shoots are grown up from them strong enough to plash; and wherever void spaces are seen, new sets are to be planted to fill them up. A new hedge raised from sets in the common way, generally requires plashing about eight or nine years after.

PLASTER, *emplastrum*, in pharmacy, is defined to be an external application, of a harder consistence than our ointments: these are to be spread according to the different circumstances of the wound, place, or patient, either upon linen or leather. If the part upon which they are to be laid be naturally hairy, it must be shaved; but that they may stick the better, the natural shape of the part must be consulted, and the plaster spread and formed accordingly, either round, square, triangular, elliptical, in a lunar form, or in shape of the

letter

letter T. Some also are divided at both ends, and others are perforated in the middle; these last are of frequent use in fractures attended with a wound; for by this contrivance the wound may be cleansed and dressed without removing the plaster. These plasters are of different forms, according to the part they are laid on; but they are usually square, or round; and indeed there is almost no part of the body which a plaster of one of those forms may not be made to serve for, if it be notched about the edges with a pair of scissars. See plate CCII. fig. 2. The uses of plasters are various; they are serviceable in securing the dressings, they also forward the maturation of the pus, agglutinate and heal wounds, unite broken bones, heal burns, assuage pain, and strengthen weak parts.

The common plaster is made by boiling one gallon of oil olive, with five pounds of litharge finely powdered, in about a quart of water, over a gentle fire, and continually stirring them, till the oil and litharge are united, and the whole acquires the consistence of a plaster.

The quicksilver plaster is made thus: Take of the common plaster one pound, of quicksilver three ounces, and of the simple balsam of sulphur a dram; and, lastly, let them be incorporated.

A cephalic is ordered by the college to be made out of two pounds of burgundy pitch, one pound of soft labdanum, and yellow rosin and yellow wax, of each four ounces; one ounce of what is called the expressed oil of mace: the pitch, rosin, and wax being first melted together, add first the labdanum, and then the oil of mace.

A strengthening plaster is made, by adding to two pounds of the common plaster melted, half a pound of frankincense, and three ounces of dragon's blood, both reduced to powder.

A drawing plaster is made thus: Take yellow rosin and yellow wax, of each three pounds; of tried mutton-suet one pound; melt all together, and strain the mixture for use.

The blistering plaster is made thus: Take of the drawing plaster two pounds, of cantharides one pound, of vinegar half a pint; the plaster being melted, a little before it hardens, sprinkle in the cantharides, reduced to a very fine powder; then add the vinegar, and beat all well together.

There are several other forms of plasters,

for which we must refer the reader to the dispensatories.

PLASTER, among builders, &c. The plaster of paris is a preparation of several species of gypsums, dug near Mont Maitre, a village in the neighbourhood of Paris; whence the name. See the article GYPSUM.

The best sort is hard, white, shining, and marbly; known by the names of plaster-stone, or parget of Mount Maitre. It will neither give fire with steel, nor ferment with aqua fortis, but very freely and readily calcines in the fire, into a very fine plaster; the use of which in building, and casting statues, is well known. See the article STUCCO.

As the modern taste runs greatly into plastering, it were to be wished that this art could be brought to its antient perfection. The plasters of the Romans were exceeding durable; witness several yards of it still to be found on the top of the pont de Garde, near Nismes. At Venice they use a very durable plaster; but as the secret of preparing it, is not known among us, it would be worth while to try whether such a substance might not be made by boiling the powder of gypsum dry over the fire, for it will boil in the manner of water; and when this boiling or recalcining was over, the mixing with it resin, or pitch, or both together, with common sulphur, and the powder of sea-shells. If these were all mixed together, and the water added to it hot, and the matter all kept hot upon the fire till the instant of its being used, so that it might be laid on hot, it is possible this secret might be hit upon. Wax and oil of turpentine may be also tried as additions; these being the common ingredients in such cements as we have accounts of are the firmest. Strong ale-wort is by some directed to be used, instead of water, to make mortar of lime-stone be of a more than ordinary strength. It is possible, that the use of this tenacious liquor in the powdered ingredients of this proposed plaster, might greatly add to their solidity and firmness.

PLASTIC, πλαστικόν, denotes a thing endued with a formative power, or a faculty of forming or fashioning a mass of matter, after the likeness of a living being; such a virtue as some of the antient epicureans, and perhaps the peripatetics too, imagined to reside in the earth, or, at least, to have antiently resided therein, by means whereof, and without any extraordinary

traordinary intervention of a creator, it put forth plants, &c. Some of them seem to be of opinion, that animals and even man himself, was the effect of this plastic power.

PLASTICE, the **PLASTIC ART**, a branch of sculpture, being the art of forming figures of men, birds, beasts, fishes, &c. in plaster, clay, stucco, or the like. See the article **SCULPTURE**.

Plastice differs from carving, in that here the figures are made by the addition of what is wanting; but in carving always by subtracting what is superfluous. The plastic art is now chiefly used among us, in fret-work ceilings; but the Italians apply it also to the mantlings of chimnies with great figures.

PLAT-VEINS, in the manege, the veins wherein we bleed horses, one in the lower part of each shoulder, and the other in the flat part of the thighs.

PLATS of a ship, flat ropes made of rope yarn, and weaved one over the other; they serve to save the cable from galling in the hawse, or to wind about the flukes of the anchors, to save the pennant of the foresheet from galling against them.

PLATA, a small island in the pacific ocean, near the coast of Peru, situated west long. 81° , south lat. 1° . It is also the name of a city of Peru, capital of the province of La Plata, situated in west long. $66^{\circ} 30'$, south lat. $22^{\circ} 30'$; and also the name of a great river of Peru, which rising in the province of La Plata, and running south-east till it joins the river Paragua, discharges itself into the atlantic ocean, below the city of Buenos Ayres.

PLATANUS, the **PLANE TREE**, in botany. See the article **PLANE TREE**.

PLATBAND, in gardening, a border or bed of flowers along a wall, or the side of a parterre frequently edged with box, &c. In architecture platband is any flat square-moulding, whose height much exceeds its projecture; such are the faces or fasciæ of an architrave, and the platbands of the modillions of a cornice.

PLATBAND of a door or window is used for the lintel, where that is made square, or not much arched; these platbands are usually crossed with bars of iron when they have a great bearing, but it is much better to ease them by arches of discharge built over them.

PLATBANDS of flutings, are the lists or fillets between the flutings of columns.

PLATE, in commerce, signifies gold or silver wrought into vessels, for domestic uses.

Plate on being imported pays the following duties, *viz.* silver plate of France on importation pays 3s. $2\frac{4}{10}$ d. the ounce; and, on exportation, draws back, 2s. $1\frac{3}{10}$ d. Plate of the East Indies, pays on importation, 2s. $2\frac{4}{10}$ d. the ounce; and, on exportation, draws back, 2s. $1\frac{3}{10}$ d. Of all other places, pays on importation, 1s. $5\frac{4}{10}$ d. the ounce; and, on exportation, draws back, 1s. $4\frac{3}{10}$ d. Silver gilt pays on importation,

the ounce, of France, 3s. $10\frac{6\frac{1}{4}}{100}$ d. and on exportation, draws back, 2s. $6\frac{18\frac{3}{4}}{100}$ d.

Of the East Indies, pays on importation, 2s. $7\frac{6\frac{1}{4}}{100}$ d. and on exportation, draws

back, 2s. $6\frac{18\frac{3}{4}}{100}$ d. Of all other places pays on importation, 1s. $8\frac{36\frac{1}{4}}{100}$ d. and on exportation, draws back, 1s. $6\frac{93\frac{3}{4}}{100}$ d.

Gold-plate wrought, pays on importation, the ounce, 19s. $1\frac{8}{10}$ d. and, on exportation, draws back, 17s. 3d.

PLATE, in heraldry, is a round flat piece of silver, without any impression; but as it were formed, ready to receive it.

PLATE is also a term used by our sportsmen, to express the reward given to the best horse at our races. See **RACE**.

PLATES, in gunnery. The prise plates are two plates of iron on the cheeks of a gun-carriage, from the cape-square to the center, through which the prise bolts go, and on which the handspike rests when it poises up the breech of the piece. Breast plates are the two plates on the face of the carriage, one on each cheek. Train-plates are the two plates on the cheeks, at the train of the carriage. Dulidge-plates are the six plates on the wheel of a gun-carriage, where the fellows are joined together, and serve to strengthen the dulidges.

PLATE-LONGE, in the manege, a woven strap, four fathom long, three fingers broad, and one thick; used for raising the legs of a horse, and sometimes for taking him down, in order to facilitate several operations of the farrier.

PLATEA, the **SPOONBILL**, in ornithology, a species of anas, with a flat beak, broad and rounded at the end, so as to resemble

resemble, in some degree, a spoon, whence the name. See plate CC. fig. 7.

It is of the shape, and about the size of our common heron. See the articles ANAS and HERON.

PLATFORM, in the military art, an elevation of earth, on which cannon is placed, to fire on the enemy; such are the mounts in the middle of curtains. On the rampart there is always a platform, where the cannon are mounted. It is made by the heaping up of earth on the rampart, or by an arrangement of madders, rising insensibly, for the cannon to roll on, either in a casemate, or on attack in the outworks.

All practitioners are agreed, that no shot can be depended on, unless the piece can be placed on a solid platform; for if the platform shakes with the first impulse of the powder, the piece must likewise shake, which will alter its direction, and render the shot uncertain.

PLATFORM, in architecture, is a row of beams, which support the timber-work of a roof, and lie on the top of the wall, where the entablature ought to be raised. This term is also used for a kind of terrace, or broad, smooth, open walk at the top of a building, from whence a fair prospect may be taken of the adjacent country. Hence an edifice is said to be covered with a platform, when it is flat at top, and has no ridge. Most of the oriental buildings are thus covered, as were all those of the antients.

PLATFORM, or **ORLOP**, in a man of war, a place on the lower deck, abaft the main-mast, between it and the cockpit, and round about the main capstan, where provision is made for the wounded men in time of action.

PLATIASMOS, a word used to express a fault in pronunciation, owing to a person's opening his mouth too wide, and then speaking indistinctly.

PLATONIC, something that relates to Plato, his school-philosophy, opinions, or the like; thus, platonic love denotes a pure spiritual affection, for which Plato was a great advocate, subsisting between the different sexes, abstracted from all carnal appetites, and regarding no other object but the mind and its beauties: or it is even a sincere disinterested friendship subsisting between persons of the same sex, abstracted from any selfish views, and regarding no other object than the person, if any such love or friendship has aught of a foundation in nature.

PLATONIC YEAR, or the **GREAT YEAR**, is a period of time determined by the revolution of the equinoxes, or the space wherein the stars and constellations return to their former places, in respect of the equinoxes. The platonic year, according to Tycho Brahe, is 25816; according to Ricciolus 25920, and according to Cassini 24800 years. See **PRECESSION**. This period once accomplished, it was an opinion among the antients, that the world was to begin anew, and the same series of things to turn over again.

PLATONISM, the doctrine and sentiments of Plato and his followers, with regard to philosophy, &c.

In physics, Plato followed Heraclitus; in ethics and politics, Socrates; and in metaphysics, he followed Pythagoras; and his disciples were called academics. See the articles **ACADEMIC**, &c.

The platonic philosophy is thought very consistent with the mosaic; and a great many of the primitive fathers follow the opinions of that philosopher, as being favourable to christianity. Justin is of opinion that Plato could not learn many things which he has said in his works from mere natural reason, but thinks he might have learnt them from the books of Moses, which he might have read when in Egypt.

PLATTOON, or **PLOTTOON**, in the military art, a small square body of forty or fifty men, drawn out of a battalion of foot, and placed between the squadrons of horse, to sustain them; or in ambuscades, straits, and defiles, where there is not room for whole battalions or regiments. Platoons are also used when they form the hollow-square, to strengthen the angles. The grenadiers are generally posted in platoons.

PLATYSMA MYOIDES, in anatomy, a name given by Fallopius to one of the muscles, called latissima colli, by some quadratus genæ, and subcutaneus by others. See **SUBCUTANEUS**.

PLAUSUS, among the Romans. See the article **ACCLAMATION**.

PLAY, *lusus*. See **GAME** and **GAMING**.

PLAY, in poetry. See the articles **DRAMA**, **TRAGEDY**, **COMEDY**, &c.

PLAY-HOUSE. See the articles **THEATRE**, **AMPHITHEATRE**, &c.

PLEA, in law, is what either party alleges for himself in court, in a cause there depending; and, in a more restrained sense, it is the defendant's answer to the plaintiff's declaration.

Pleas are usually divided into those of the crown and common pleas. Pleas of the crown are all suits in the king's name, or in the name of the attorney-general on his behalf, for offences committed against his crown and dignity, and against his peace; as treason, murder, felony, &c. Common pleas are such suits as are carried on between common persons, in civil cases. These pleas may be divided into as many branches as there are actions. To an action there is either a general or a special plea: and here, a general plea is a general answer to the declaration, as in a debt or contract; the general plea is, that he owes nothing; in a debt upon bond, that it is not his deed, or he paid it on the day; in an action on a promise, that he made no promise; and in a trespass, not guilty. Special pleas are either in bar to the action brought, or in abatement of the writ on which the action is framed. All pleas are to be succinct, without any unnecessary repetitions, and must be direct and pertinent to the case.

Court of common PLEAS. See the article COMMON PLEAS.

PLEADING, in law, a speech uttered at the bar, in defence of a cause: but, in a stricter sense, pleadings are all the allegations of the parties to a suit, made after the declaration, till the issue is joined. In this sense they express what is contained in the bar, replication, and rejoinder; and not what is in the declaration itself. Hence defaults in the matter of declaration are not confined within the mispleading.

From the conquest all pleading was performed in french, till the reign of Edward III. when it was appointed that the pleas should be pleaded in english; but that they should be entered or recorded in latin. At Athens, and even in France and England, formal and prepared pleadings were prohibited, and it was unlawful to amuse the court with long artful harangues; only it was the settled custom here, in important matters, to begin the pleadings with a text out of the holy scriptures. It is but of late years that eloquence was admitted to the bar.

PLEASURE and pain, says Mr. Locke, are simple ideas, which we receive both from sensation and reflection; there being thoughts of the mind, as well as sensations, accompanied with pleasure or pain. See the article PAIN.

There are a great many modes of pleasure and pain, which result from the various considerations of good and evil, whether natural or moral, and the passions thereby excited. See the articles GOOD, EVIL, and PASSIONS.

Pleasure and pain seem to be the means made use of, by nature, to direct us in the pursuit of happiness; since pleasure is annexed to whatever contributes thereto, and pain is the companion of what tends to our ruin. Hence it is, that the pleasures of a child, a youth, a grown person, and an old man, all vary, according to the different things required by nature in each state, whether simply for the preservation of the individual, or for that and propagation jointly.

PLEBEIAN, *plebeius*, any person of the rank of the common people. It is chiefly used in speaking of the antient Romans, who were divided into senators, knights, and plebeians or commons.

PLEBISCITUM, in roman antiquity, a law enacted by the common people, at the request of the tribune, or other plebeian magistrate, without the intervention of the senate; but more particularly denotes the law which the people made, when they retired to the Aventine mount.

PLECTRONITÆ, in natural history, the same with the conicthyodontes. See the article CONICTHYODONTES.

PLEDGE, *plegius*, in common law, a surety, either real or personal, which the plaintiff is to find, for prosecuting the suit. See the article SURETY.

PLEDGERY, or **PLEGGERY**, suretiship, or an answering for another person.

PLEDGET, **BOLSTER**, or **COMPRESS**, *plumaceolus*, in surgery, a kind of flat tent, laid over a wound, to imbibe the superfluous humours, and keep it clean. See the article WOUND.

PLEGIIS ACQUIETANDIS, in law, a writ that lies for a surety, in case he pay not the money at the day.

PLEIADES, *vergilie*, in astronomy, an assemblage of stars in the neck of the constellation taurus. See TAURUS.

PLENARTY, in law, is when a church-benefice is full of an incumbent. See the article INCUMBENT.

Institution is held to be a good plenarty against a common person, but not against the king, without induction. See the article INSTITUTION and INDUCTION.

PLENARY, some thing complete or full. **PLE-**

PLENILUNIUM, in astronomy, that phase of the moon commonly called the full moon. See the article **MOON**.

PLENIPOIENTIARY, a person vested with full power to do any thing. See the article **EMBASSADOR**.

The term plenipotentiary is chiefly applied to such ministers of princes or states as are sent to treat of peace, &c.

PLENITUDE, *plenitudo*, the quality of a thing that is full, or that fills another. In medicine, it chiefly denotes a redundancy of blood and humours. See the article **PLETHORA**.

PLENUM, in physics, denotes, according to the cartesians, that state of things, wherein every part of space is supposed to be full of matter; in opposition to a vacuum. See the article **VACUUM**.

PLEONASM, *pleonasmus*, *redundantia*, a figure in rhetoric, whereby we use words seemingly superfluous, in order to express a thought with the greater energy: such as, I saw it with my own eyes, &c.

This grammarians usually reckon a fault in discourse.

PLEROTICS, *plerotica*, in medicine, a kind of remedies that are healing, or that fill up the flesh: otherwise called incarnatives and sarcotics. See the article **SARCOTICS**.

PLESKOW, a city of Russia, situated at the south end of the lake Worsero: east. long. $28^{\circ} 30'$, and north lat. $57^{\circ} 20'$.

PLESSE, a town of Silesia, situated on the river Vistula, thirty-five miles east of Troppaw.

PLETHORA, in medicine, a greater redundancy of laudable blood and humours than is capable of undergoing those changes which must necessarily happen for the purposes of life, without inducing diseases.

A plethora is cured by venesection, exercise, watchings, a sharp and acrid diet, after due evacuations, and by a gradual omission of these evacuations.

PLETHORIC, *plethoricus*, a person abounding with blood, or labouring under a plethora.

PLEVIN, *plevina*, in law, the same with pledge. See the article **PLEDGE**.

PLEURA, in anatomy, a smooth, robust, and tense membrane, adhering to the ribs and to the intercostal muscles, and surrounding the whole cavity of the thorax. Its structure resembles two sacks, one of which surrounds one side of the thorax, and the other the other side, and

each of them contains one of the two lobes of the lungs: from the conjunction of these two sacculi of the pleura, in the middle of the thorax, is formed the mediastinum. See **MEDIASTINUM**.

The pleura is composed of a double membrane of a very musculous structure. Its vessels are arteries, veins, nerves, and lymphatics. The arteries arise from the intercostals, the diaphragmatic, and the mammary ones, and are very numerous; the veins, from the veins of the same name with those arteries; but all of them discharge themselves into the trunk of the vena azygos, and the upper trunk of the cava. The nerves are from the vertebræ of the thorax and the diaphragmatic ones. The lymphatics all run to the ductus thoracicus.

The use of the pleura is to lubricate and strengthen the whole cavity of the thorax.

PLEURISY, *πleurisie*, in medicine, a violent pain in the side, attended with an acute fever, a cough, and a difficulty of breathing.

This disorder affects all the parts of the internal integuments of the thorax, the whole of the pleura, and the whole of the mediastinum; and therefore, when it is seated in the membrane internally lining the ribs, it is called a true or internal pleurisy; but when it chiefly occupies the external parts, and only the intercostal muscles, and those above them, are affected, it is called a spurious or bastard-pleurisy.

The pleurisy is most predominant between the spring and summer. It begins with chillness and shivering, which are soon succeeded by heat, thirst, inquietude, and the other common symptoms of a fever. After a few hours the patient is seized with a violent pricking pain in one of his sides, about the ribs, which sometimes extends itself towards the shoulder-blades, sometimes towards the back-bone, and sometimes towards the fore-parts of the breast, and this is attended with frequent coughing. The matter which the patient spits, is at first little and thin, and mixed with particles of blood; but as the disease advances, it is more plentiful and more concocted, but not without a mixture of blood. The pulse is remarkably strong, and seems to vibrate like a tense string of a musical instrument; and the blood drawn from a vein, as soon as it is cold, looks like melted suet. As to the spitting, it is frequently absent, and hence pleurises are distinguished into moist and dry.

As in all inflammatory fevers, so in this, too hot a regimen is to be shunned, both with respect to the bed-cloaths and the heat of the room; nor must the patient be exposed to the cold air, nor drink things actually cold. Hoffman observes that all strong sudorifics and cathartics are hurtful; and that if the patient has three or four stools, the course of nature must not be stopped. The diet should be cooling, relaxing, slender, and diluting. Moistening things taken warm, are preferable to all others; and hence barley or oatmeal-gruel, sweetened with honey, and also sweet whey, are proper. If the physician is called before the third day, Boerhaave directs a large quantity of blood to be let, from a wide orifice in a large vessel, and to fetch deep sighs, or cough, to promote its celerity; and the part affected should be rubbed gently at the same time, and the bleeding continued till the pain remits, or the patient is ready to faint. This should be repeated as often as the symptoms return, which it was intended to remove, and till the absence of the white inflammatory pellicle from the surface of the blood when cold, shews it is time to leave it off. This Huxham confirms by his own experience, and adds, that after the fourth day, bleeding is not safe; he likewise recommends fomenting the part, which often eases the pain, and terminates the disease: but if it is obstinate, he recommends slight scarifications, then cupping, and afterwards a blister on the same place; which has been successful, when the usual methods failed. The patient's body should be kept open, for which purpose emollient clysters are proper; and he should, at the same time, take large quantities of strong, diluting, aperient, and antiseptic liquors: for this purpose, take the leaves of scordium, jack-by-the-hedge, and white horehound, each two ounces; boil them in two points of water, with which mix of the oxymel of squills, eight ounces; of nitre, three drams; and of treacle-vinegar, one ounce: of this mixture let the patient, every quarter of an hour, take two ounces, as warm as possible.

Dr. Mead observes, on the treatment of this disorder, that after drawing as much blood as is necessary, draughts with fresh-drawn linseed-oil, are of great service for easing the cough; nitre, for allaying the heat; and for dissolving the fizy blood that obstructs the small canals,

wild goat's blood and volatile salts; and, lastly, a blister laid on the part affected, in order to draw forth the peccant humour.

A purulent abscess or empyema is sometimes formed in this disease, for the treatment of which, see EMPYEMA.

As to the bastard-pleurisy, Hoffman says that it is properly a kind of rheumatism, and does not require bleeding, unless the patient is plethoric, but a diaphoresis and a more free perspiration. Lancisi, however, advises plentiful bleeding in the arm, scarifying the part affected, and cupping: and during the cure, it is necessary to keep the body open, and the bowels free from spasms; for which purposes, emollient clysters are proper, with oil of sweet almonds.

PLEURONECTES, in ichthyology, a genus of malacopterygious fishes, the eyes of which are both placed on one side of the head, and this is sometimes the right and sometimes the left; the branchiostege membrane contains on each side six small bones.

To this genus belong the plaice, flounder, and turbot, which have both the eyes on the right side; and the pearl and soal, which have both the eyes on the left side.

PLEUROPNEUMONY, in medicine, a disease partaking of the nature both of a pleurisy and peripneumony. See the articles **PLEURISY** and **PERIPNEUMONY**.

PLEXUS, among anatomists, a bundle of small vessels interwoven in the form of net-work: thus a congeries of vessels within the brain is called plexus choroides, reticularis, or retiformis. See the article *Plexus CHOROIDES*.

A plexus of nerves is an union of two or more nerves, forming a sort of ganglion or knot.

PLICA POLONICA, in medicine, a disease of the hair, almost peculiar to Poland and Lithuania, and hence denominated polonica. It consists of a preternatural bulk of the hair, which being firmly conglutinated and wrapped up in inextricable knots, and extended to a monstrous length, affords a very unseemly spectacle. When these are cut off, the blood is discharged from them, the head racked with pain, the sight impaired, and the patient's life frequently endangered.

This disorder is supposed to arise from the sordid and nasty manner of life to which these people are addicted, and from an hereditary fault conveyed from the parents,

rents, which consists in too great a bulk of the pores and bulbous hairs under the skin of the head: hence the thick and glutinous nutritious juice, produced by their coarse aliments and impure waters, is by heat forced into the cavities of the hairs, and sweating through their pores, produces this terrible disease.

A perfect method of curing this disorder is unknown; undoubtedly because in those parts of Poland, in which this disease is endemial, there have been few physicians, who, from what is commonly known of the nature and cure of the plica polonica, have been able to lay down a rational and judicious plan for treating it. It is certain, that purging and venesection are so far from being beneficial in this disorder, that they often prove hurtful, by throwing the peccant humours into violent commotions, and more effectually distributing them through the whole body. It is therefore most safe and expedient to solicit the peccant matter to the hairs, to which it naturally tends: and this intention, Senertus says, is most effectually answered by lotions prepared of bear's breech.

PLICATED, something folded together, one part over another; as the leaves of certain plants, &c.

PLIMOUTH, a port-town of Devonshire, and a station for the building and laying up of ships of war belonging to the royal navy: west long. $4^{\circ} 27'$, north lat. $50^{\circ} 26'$.

It sends two members to parliament.

PLIMOUTH is also a port-town of New-England, and the capital of a county of the same name: west long. 71° , north lat. $41^{\circ} 25'$.

PLIMTON, a borough-town of Devonshire, situated near the english Channel, thirty six miles south-west of Exeter.

It sends two members to parliament.

PLINIA, in botany, a genus of the polyandria-monogynia class of plants, the flower of which consists of a single petal, divided into five hollow oval segments: the fruit is a large, globose, and unilocular berry; containing a single, very large globose and smooth seed.

PLINTH, ORLE, or ORLO, in architecture, a flat square member, in the form of a brick.

It is used as the foundation of columns, being that flat square table, under the moulding of the base and pedestal at the bottom of the whole order. It seems to

have been originally intended to keep the bottom of the original wooden pillars from rotting.

Vitruvius also calls the tuscan abacus, plinth.

PLINTH of a statue, &c. is a base, either flat, round, or square, that serves to support it.

PLINTH of a wall, denotes two or three rows of bricks advancing out from a wall; or, in general, any flat high moulding, that serves in a front wall to mark the floors, to sustain the eaves of a wall, or the larmier of a chimney.

PLOCE, a figure in rhetoric, whereby a word is repeated by way of emphasis, so as not only to express the subject, but the quality thereof; *e. gr.* *His wife is a wife indeed!*

PLOCSKOW, the capital of a palatinate of the same name, in Poland, fifty miles north-west of Warsaw.

PLOEN, a city of Holstein, in Germany, twenty-four miles north-west of Lubec: east long. 10° , north lat. $54^{\circ} 40'$.

PLOT, in dramatic poetry, is sometimes used for the fable of a tragedy or comedy, but more particularly the knot or intrigue, which makes the embarras of any piece. The unravelling puts an end to the plot.

PLOT, in surveying, the plan or draught of any field, farm, or manor surveyed with an instrument, and laid down in the proper figure and dimensions.

PLOTTING, among surveyors, is the art of laying down on paper, &c. the several angles and lines of a tract of ground surveyed by a theodolite, &c. and a chain.

In surveying with the plain-table, the plotting is saved; the several angles and distances being laid down on the spot, as fast as they are taken. See the article **PLAIN-TABLE**.

But, in working with the theodolite, semicircle, or circumferentor, the angles are taken in degrees; and the distances in chains and links; so that there remains an after-operation to reduce these members into lines, and so to form a draught, plan, or map; this operation is called plotting.

Plotting then is performed by means of two instruments, the protractor and plotting-scale. By the first, the several angles observed in the field with a theodolite, or the like, and entered down in degrees in the field-book, are protracted on paper in their just quantity.

By

By the latter, the several distances measured with the chain, and entered down in like manner in the field-book, are laid down in their just proportion.

Under the articles protractor and plotting-scale, are found severally the use of their respective instruments in the laying down of angles and distances: we shall here give their use conjointly in the plotting of a field, surveyed either with the circumferentor or theodolite.

Method of PLOTTING from the circumferentor. Suppose an enclosure, *e. gr.* A B C D E F G H K (plate CCV. fig. 1.) to have been surveyed; and the several angles, as taken by a circumferentor, in going round the field, and the distances as measured by a chain, to be found entered in the field-book, as in the following table:

| | Deg. | Min. | Cha. | Links. |
|---|------|------|------|--------|
| A | 191 | 00 | 10 | 75 |
| B | 297 | 00 | 6 | 83 |
| C | 216 | 30 | 7 | 82 |
| D | 325 | 00 | 6 | 96 |
| E | 12 | 24 | 9 | 71 |
| F | 324 | 30 | 7 | 54 |
| G | 98 | 30 | 7 | 54 |
| H | 71 | 00 | 7 | 78 |
| K | 161 | 30 | 8 | 22 |

On a paper of the proper dimensions, as LMNO (*ibid.*) draw a number of parallel and equidistant lines. Their use is to direct the position of the protractor; the diameter whereof must always be laid either upon one of them or parallel thereto; the semi-circular limb downwards for angles greater than 180° , and upwards, for those less than 180° .

The paper being thus prepared, assume a point on some meridian, as A, whereon lay the center of the protractor, and the diameter along the line. Consult the field-book for the first angle, *i. e.* for the degrees cut by the needle at A, which the table gives you 191° .

Now since 191° is more than a semi-circle, or 180° , the semi-circle of the protractor is to be laid downwards; where keeping it to the point with the protracting-pin, make a mark against 191 ; through which mark, from A, draw an indefinite line A b. The first angle thus protracted, again consult the book, for the length of the first line A B; thus you find 10 chains 75 links. From a convenient scale, therefore, on the plotting-scale, take the extent of 10 chains 75 links between the compasses; and, setting one point in A, mark where the

other falls in the line A b, which suppose in B: draw therefore the full-line A B, for the first side of the inclosure.

Proceed then to the second angle, and laying the center of the protractor on the point B, with the diameter as before directed, make a mark, as c, against 297° , the degrees cut at B; and draw the indefinite line B c. On this line from the plotting-scale, as before, set off the length of your second line, *viz.* 6 chains 83 links; which extending from B to the point C, draw the line B C for the second side. Proceeding now to the third angle or station, lay the center of the protractor, as before, on the point C; make a mark, as d, against the number of degrees cut at C; *viz.* $216^\circ 30'$; draw the indefinite line C d, and thereon set off the third distance, *viz.* 7 chains 82 links; which terminating *e. gr.* at D, draw the full line C D for the third side. Proceed now to the fourth angle D; and, laying the center of the protractor over the point D, against 325° , the degree cut by the needle, make a mark e; draw the dry line D e, and thereon set off the distance 6 chains 96 links, which terminating in E, draw D E for the fourth line, and proceed to the fifth angle, *viz.* E.

Here the degrees cut by the needle being $12^\circ 24'$ (which is less than a semi-circle) the center of the protractor must be laid on the point E, and the diameter on the meridian, with the semi-diameter limb turned upwards. In this situation make a mark, as before, against the number of degrees, *viz.* $12^\circ 24'$, cut by the needle at E; draw the dry line E f, on which set off the fifth distance, *viz.* 9 chains 71 links, which extending from E to F, draw the full line E F, for the fifth side of the inclosure. After the same manner proceed orderly to the angles F, G, H, and K; then placing the protractor, making marks against the respective degrees, drawing indefinite dry lines, and setting off the respective distances as above, you will have the plot of the whole inclosure A B C, &c.

Such is the general method of plotting from this instrument; but it must be observed, that in this process the stationary lines, *i. e.* the lines wherein the circumferentor is placed to take the angles, and wherein the chain is run to measure the distances, are properly the lines here plotted. When, therefore, in surveying, the stationary lines are at any distance

Fig. 1. PLOTTING

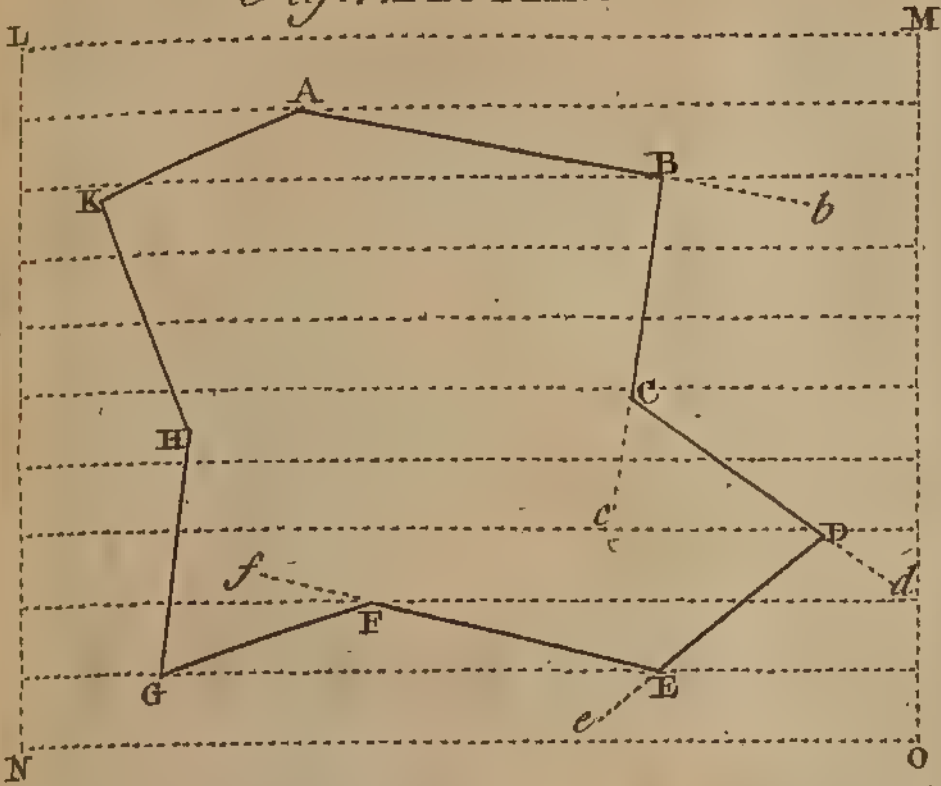


Fig. 3. POINTS

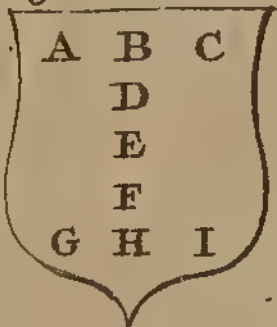


Fig. 4. PORTATE



Fig. 5. POTANCE



Fig. 6. POTENT

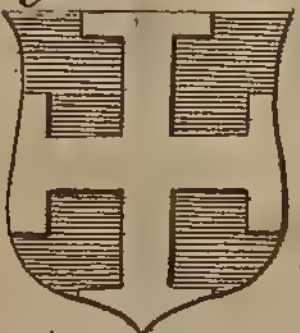


Fig. 7. PORCUPINE

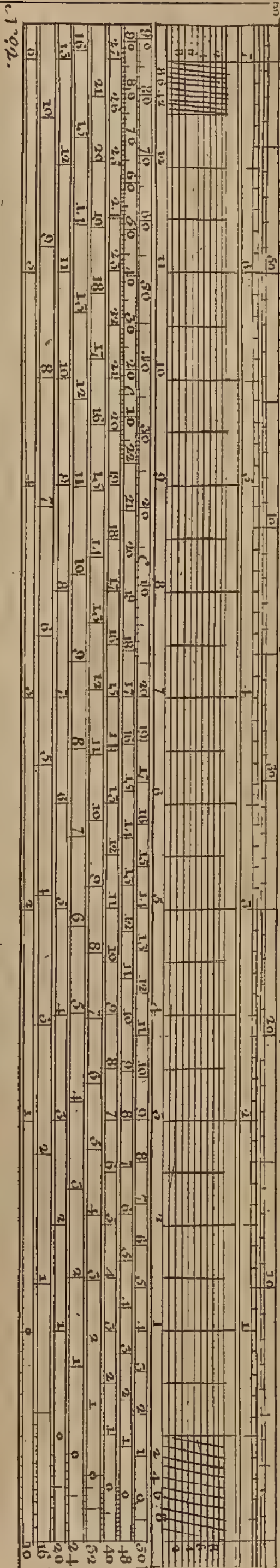


Fig. 2. PLOTTING-SCALE.

distance from the fence or boundaries of the field, &c. off-sets are taken, *i. e.* the distance of the fence from the stationary line is measured at each station; and even at intermediate places, if there prove any considerable bends in the fence.

In plotting, therefore, the stationary lines being laid down as above, the off-sets must be laid down from them, *i. e.* perpendiculars of the proper lengths must be let fall at the proper places from the stationary lines. The extremes of which perpendiculars, being connected by lines, give the plot desired. If instead of going round the field the angle and distances have been all taken from one station, the process of plotting is obvious, from the example above: all here required being to protract, after the manner already described, the several angles and distances taken from the same stationary point in the field, from the same point or center of the paper. The extremities of the lines thus determined, being then connected by lines, will give the plot required.

PLOTTING-SCALE, a mathematical instrument, usually of wood, sometimes of brass, or other matter; and either a foot, or half a foot long.

On one side of the instrument (plate CCV. fig. 2. n^o 2.) are seven several scales, or lines, divided into equal parts. The first division of the first scale is subdivided into ten equal parts, to which is prefixed the number 10, signifying that ten of those subdivisions make an inch; or that the divisions of that scale are decimals of inches.

The first division of the second scale is likewise subdivided into 10, to which is prefixed the number 16, denoting that sixteen of these subdivisions make an inch. The first division of the third scale is subdivided in like manner into 10, to which is prefixed the number 20; to that of the fourth scale is prefixed the number 24; to that of the fifth, 32; that of the sixth, 40; that of the seventh, 48; denoting the number of subdivisions equal to an inch, in each, respectively.

The two last scales are broken off, to make room for two lines of chords. There is also on the back-side of the instrument a diagonal scale. See **SCALE**.

As to the use of the plotting, if we were required to lay down any distance upon paper, suppose 6 chains 50 links: draw an indefinite line; then setting one foot

of the compasses at figure 6 on the scale, *e. gr.* the scale of 20 in an inch, extend the other to 5 of the subdivisions, for the 50 links: this distance, being transferred to the line, will exhibit the 6 chains 50 links required.

If it be desired to have 6 chains 50 links take up more or less space, take them off from a greater or lesser scale, *i. e.* from a scale that has more or fewer divisions in an inch.

To find the chains and links contained in a right line, *e. gr.* that is just drawn, according to any scale, *e. gr.* that of 20 in an inch. Take the length of the line in the compasses, and applying it to the given scale, you will find it extend from the number 6 of the great divisions, to 5 of the small ones: hence the given line contains 6 chains 50 links.

PLOVER, *pluvialis*, in ornithology, the english name of several very distinct birds; as the green plover, or variegated black and yellowish charadrius, about the size of the common lapwing; and the grey plover, or blackish-brown tringa, with a black beak and green legs, a very beautiful bird. See the articles **CHARADRIUS** and **TRINGA**.

Bastard-PLOVER, the name by which the vanellus, or lapwing, is called in several parts of the kingdom. See the article **VANELLUS**.

PLOUGH, in agriculture, a machine for turning up the soil, contrived to save the time, labour, and expence that without this instrument must have been employed in digging land, to prepare it for the sowing of all kinds of grain.

The structure of a plough is various for various kinds of grounds; but the common two-wheeled plough, in plate CCVI. fig. 1. used in almost all the countries in the south of England, is generally esteemed the best for all sorts of land, except such miry clays as stick to the wheels, and clog them up so as to prevent their turning round. It is commonly divided into two parts, the plough-head, and the plough-tail. The plough-head contains the two wheels A, B, and their axis, or iron-spindle, which passes through the box C, and turns round both in it and in the wheels; the two crow-staves D, D, fastened perpendicularly into the box, having in each two rows of holes, in order to raise or sink the beam, by pinning up or down the pillow E, to encrease or diminish the depth of the furrow; the gallows F, through which the crow-staves

staves pass at top, by mortises into which they are pinned; G the wilds, with its links and crooks of iron, by which the plough is drawn; H the tow-chain, which fastens the plough-tail to the plough-head, by the collar I at one end, and by the other end passing through a hole in the middle of the box, where it is pinned in by the stake K; L the bridle-chain, one end of which is fastened to the beam with a pin, and the other end to the top of the stake, which stake is held up to the left crow-staff, by the end of the wyth or rope M passing round it above, and under the end of the gallows below, or by the end of the bridle-chain itself, when that is long enough. The plough-tail consists of the beam, N; the coulter, O; the share, P; and the sheat, Q; the hinder sheat, R, passing thro' the beam near its end; S the short handle, fastened to the top of the hinder sheat by a pin, and to the top of the fore-sheat by another pin; T the drock, which belongs to the right-side of the plough-tail, and to which the ground-wrist V is fastened; as is the earth-board, whose fore-part W, is seen before the sheat; as also the long handle X, whose fore-part Y appears before the sheat, and is fastened to the drock by the pin at *a*, the other end of which pin goes into the beam. Z is the double reach, which holds up the sheat, and passes through the beam to be fastened by its screws and nuts at *b* and *c*.

The structure of the four-coultered plough (*ibid.* fig. 2.) is in several respects different from this, though in general founded on it. Its beam is ten feet four inches long, whereas that of the common plough is but eight feet: it differs also in shape; for as the other is straight from one end to the other, this is straight only from *a* to *b*, and thence turns up, in the manner shewn in the plate; so that a perpendicular line let down from the corner at *a*, to the even surface on which the plough stands, would be eleven inches and an half, which is its height in that place; and if another line was let down from the turning of the beam at *b*, to the same surface, it would be one foot eight inches and a half, which is the height the beam stands from the ground at that part; and a third line let down to the surface from the bottom of the beam, at that part which bears upon the pillow, will shew the beam to be, in that part, two feet ten inches high above

the surface. At the distance of three feet two inches from the end of the beam, at the plough-tail, the first coulter, or that next the share, is let through: and at thirteen inches from this, a second coulter is let through: a third at the same distance from that; and, finally, a fourth at the same distance from the third. The crookedness of the beam is to avoid the too great length of the foremost coulters, which would be so long if the beam was straight all the way, that they would be apt to bend and be displaced, unless they were vastly thick and clumsy.

The sheat in this plough is to be seven inches broad, and the fixing the sheat in this, as well as in the common plough, is the nicest part, and requires the utmost art of the maker; for supposing the axis of the beam, and the left-side of the share to be both horizontal, they must never be set parallel to each other; but the straight side of the share must make an angle on the left-side of the beam, which must be very acute, that the tail of the share may press less against the side of the trench than the point does: this angle is shewn by the pricked lines at the bottom of fig. 1. where the line *ef* is supposed to be the axis of the beam let down to the ground, and the line *gh*, parallel to the left-side of the share. The great thing to be taken care of, is the placing the four coulters, which must be so set that the four imaginary planes described by the four edges, as the plough moves forwards, may be all parallel to each other, or very nearly so; for if any one of them should be very much inclined to, or should recede much from either of the other, then they would not enter the ground together. In order to the placing them thus, the second coulter-hole must be two inches and a half more on the right-hand than the first; the third must be as much more to the right of the second; and the fourth the same distance to the right of the third; and this two inches and a half must be carefully measured from the center of one hole to the center of the other. Each of these holes is a mortise of an inch and a quarter wide, and is three inches and a half long at the top, and three inches at the bottom. The two opposite sides of the holes are parallel to the top and bottom, but the back is oblique, and determines the obliquity of the standing of the coulter, which is wedged

Fig. 1. PLOUGHS.

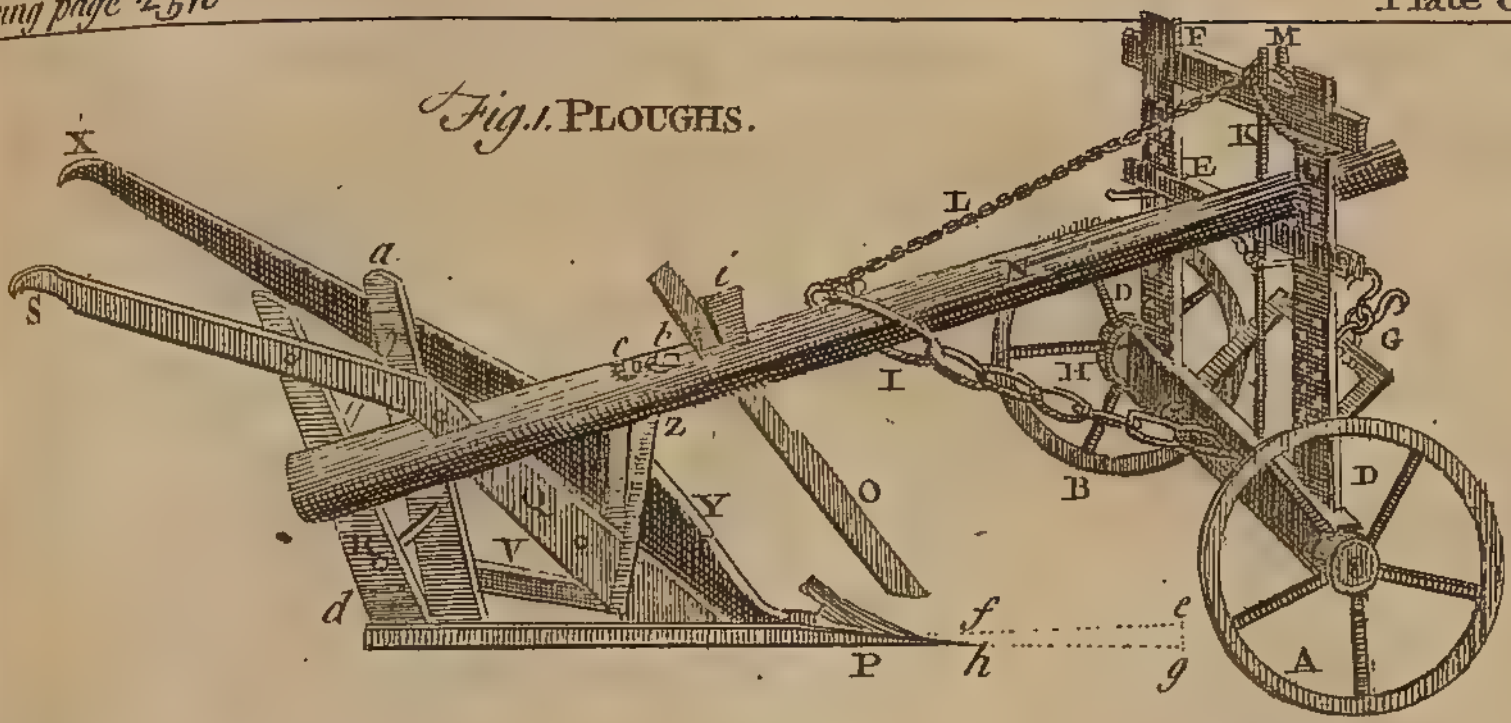


Fig. 2.

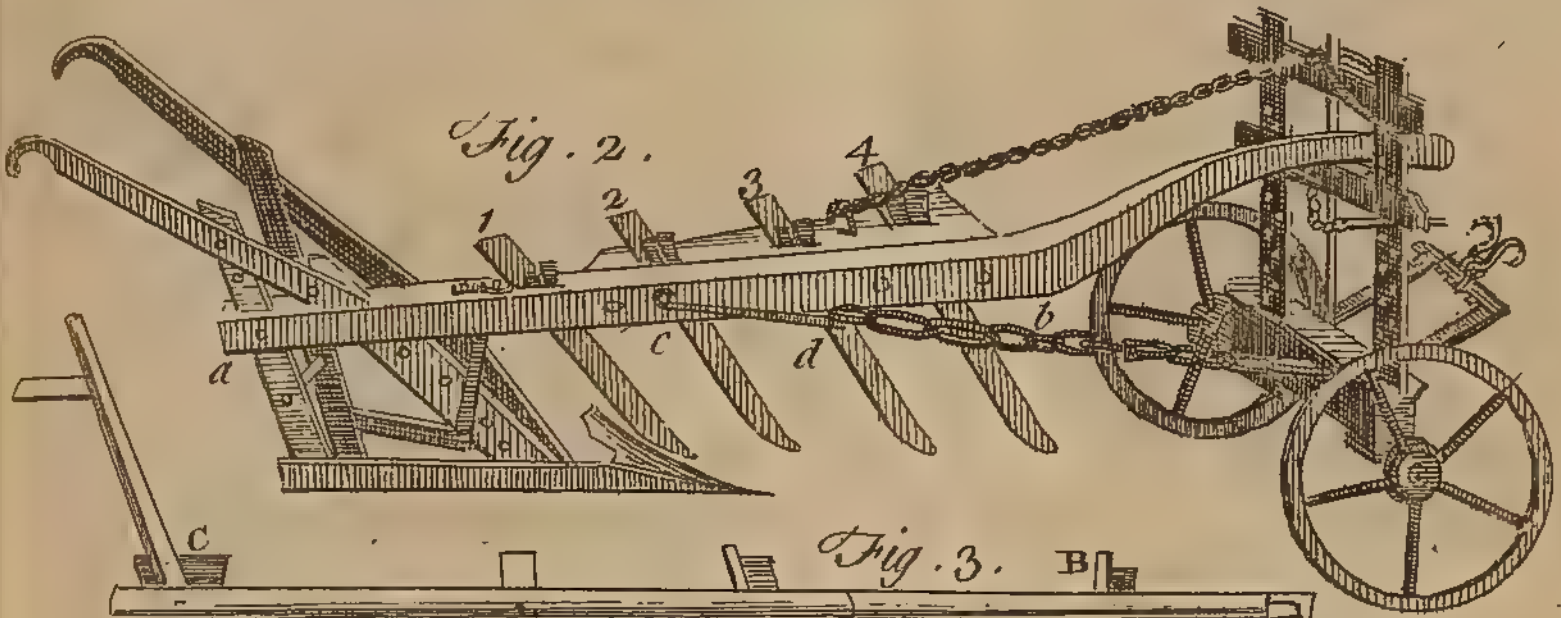


Fig. 3.

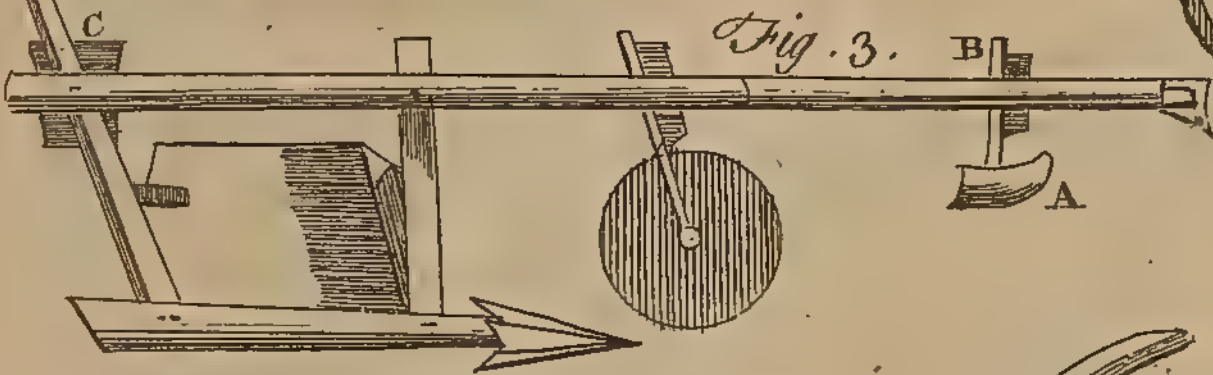


Fig. 4.

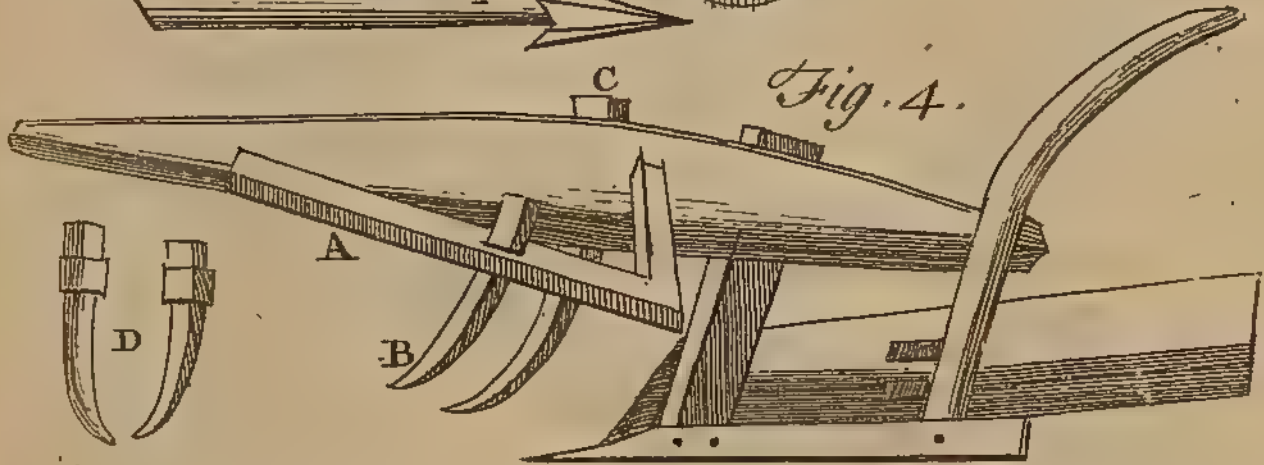


Fig. 5.

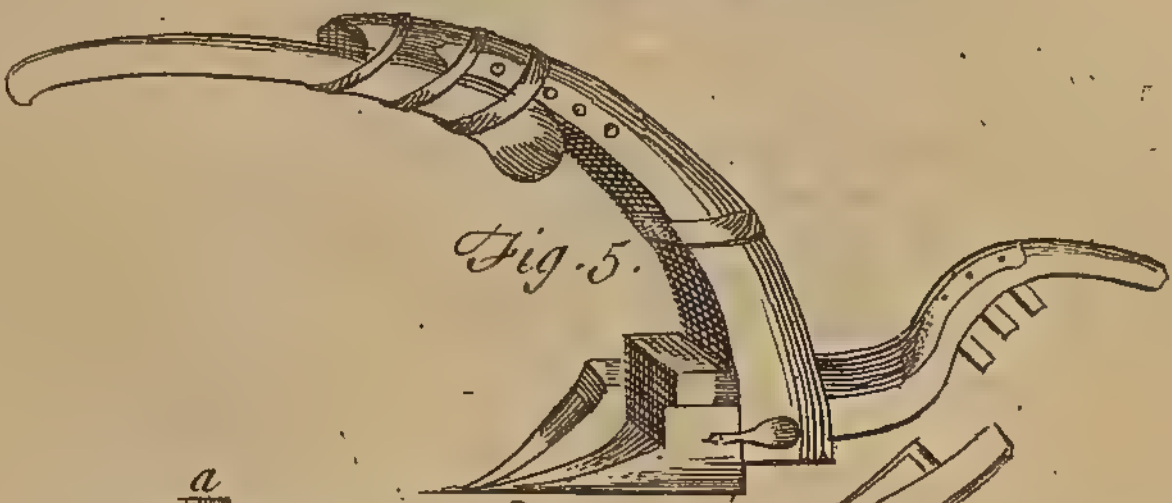
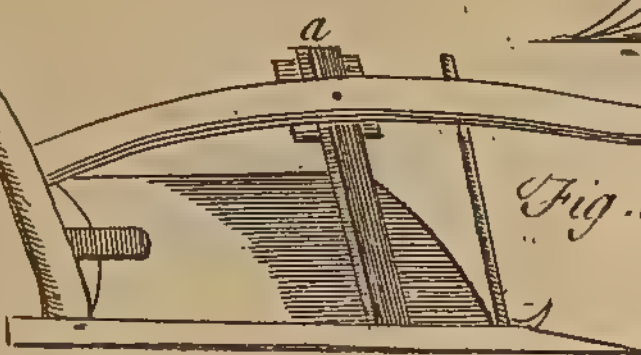


Fig. 6.



wedged tight up by pieces of wood. The coulters are two feet eight inches long, of which sixteen inches are allowed for the handle, which is to be thus long that the coulters may be drawn down as the point wears away. As to the wheels, the left-hand wheel is twenty inches diameter, and that on the right-hand, two feet three inches; and the distance the wheels are set from each other is two feet five inches and a half.

Besides these there are the Lincolnshire-plough, proper for fenny lands subject to weeds and sedges, and remarkable for the largeness of its share, which is frequently a foot broad and very sharp, (*ibid.* fig. 3.). At A is a foot, which is set higher or lower, by a wedge drove in at B; and which keeps the forepart of the plough from going deeper than they would have it. At C there are wedges by which the hinder part is set. Instead of a coulters there is a wheel with a sharp edge, which cuts the roots of the grass or sedge as it turns round, while the broad share cuts them up at the bottom.

The Caxton or trenching-plough, invented to cut drains about Caxton in Cambridgeshire, in stiff, miry, clay-ground. This plough (*ibid.* fig. 4.) is larger and stronger than ordinary: to the beam is fixed a piece of wood at A, in which is a coulters set at B, and another set in the beam at C, which two coulters stand bending inwards as at D, to cut each side of the trench. The share is very flat and broad, in order to form the bottom of the trench; and the mould-board is three times the length of other ploughs, in order to cast the turf a great way from the trench. This plough cuts a trench a foot wide at the bottom, a foot and a half broad at the top, and a foot deep, and it is drawn with twenty horses.

But the most common plough, says Mortimer, is the dry-plough, represented fig. 6. which is best for miry clays, when the land is soft; but is extremely bad in summer, when the land is hard, because its point will be continually flying out of the ground: it is set higher or lower, by wedges at a. Fig. 5. is a Spanish plough, with which, and one horse, they will plow two or three acres of their light lands in a day. We have given a figure of it, merely on account of its singularity.

VOL. III.

For the hoe and drill-ploughs, invented by Jethro Tull, esq; see his Essay on Horse hoeing husbandry.

PLOUGH, among book-binders, is a machine for cutting the edges of the leaves of books smooth. See **BOOK-BINDING**.

PLOUGHMAN, the person who guides the plough in the operation of tilling. See **TILLAGE** and **PLOUGH**.

PLOUGHMAN'S SPIKENARD. See the article **SPIKENARD**.

PLOUGHING, or **PLOWING**, in agriculture, turning up the earth with a plough. Ploughing is principally either that of lays or of fallows. Plowing of lays, is the first cutting up of grass-ground for corn, and is a work commonly performed in January. The best time for doing it is when the land is wet, because the turf is then soft and tough, and will turn up without breaking. In the well turning of this consists the chief part of this sort of ploughing, which if rightly performed, will lay the turf so flat and true, that it can hardly be seen where the plough went. This, indeed, depends greatly upon the make of the plough; but if the earth-board does not turn the turf well, some nail upon it a small piece of wood to take the upper part of the earth as it rises upon the earth-board, which causes it to fall with the grass-side downwards. Plowing of fallows, called also fallowing, is preparing land by ploughing long before it is plowed for seed. See the article **FALLOWING**.

PLUDENTS, a town of Germany, in the county of Tyrol, sixty-five miles west of Inspruc.

PLUG, a large wooden peg made to stop the bottom of a cistern, or a hole in a cask, pipe, or the like.

PLUKNETIA, in botany, a genus of plants, the characters of which are not so certainly known as to say to which class it belongs: the male and female flowers are produced separately on the same plant; the corolla is composed of four oval and patent petals, and the stamina form a short pyramidal body: the fruit is a depressed quadrangular capsule, containing a single, roundish and compressed seed.

PLUM-TREE, *prunus*, in botany, a genus of the icosandria-monogynia class of plants, the flower whereof consists of five roundish, concave and large petals: the fruit is a roundish drupe, marked with a longitudinal furrow, and contain-

ing a compressed and acute-pointed nut, with the futures standing out each way in an edge.

This genus comprehends the plum, cherry, and apricot, three well known kinds of fruit.

Hog's PLUM, a plant called by botanists *spondias*. See the article *SPONDIAS*.

Date PLUM, *diospyros*. See *DIOSPYROS*.

PLUMAGE, the feathers which serve birds for a covering. See *FEATHER*.

Plumage is, in falconry, particularly understood of the feathers under a hawk's wing. Falconers give their hawks small feathers to make them cast, and these also they call plumage.

PLUMB-LINE, among artificers, denotes a perpendicular to the horizon; so called as being commonly erected by means of a plummet. See *PLUMMET*.

PLUMBAGO, **LEADWORT**, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of a single funnel-fashioned petal; and its seed is single, and contained in the cup.

PLUMBAGO, **MOCK-LEAD**, or **BLACK-LEAD**, in mineralogy, a fossil substance, resembling lead-ore, much used in drawing, and for making pencils. See the article *PENCIL*.

It is somewhat difficult to ascertain what class of minerals black-lead belongs to. Metal it is not, as not being either ductile or even fusible; nor can it be reckoned among stones, for want of hardness; it remains, therefore, that it must be placed among the earths, though it dissolve not in water, as most earths will, except stiff clays and ochres; among the latter whereof Dr. Plott judges it may be reckoned, it seeming to be a sort of close earth, of very fine and loose parts, so burnt as to become black and shining, discolouring the hands, as all ochres do. Whence the most proper name that can be given it, according to this author, is *ochra nigra*, or black ochre. See the article *OCHRE*.

PLUMBERY, the art of casting and working lead, and using it in buildings, &c. See the article *LEAD*.

As this metal melts very easily, it is easy to cast it into figures of any kind, by running it into moulds of brass, clay, plaster, &c. But the chief article in plumbery is sheets and pipes of lead; and as these make the basis of the plumber's work, we shall here give the process of making them. In casting sheet-lead,

a table or mould is made use of, which consists of large pieces of wood well jointed, and bound with bars of iron at the ends, on the sides of which runs a frame consisting of a ledge, or border of wood, two or three inches thick, and two or three inches high from the mould, called the sharps: the ordinary width of the mould, within these sharps, is from three to four feet; and its length is sixteen, seventeen, or eighteen feet. This should be something longer than the sheets are intended to be, in order that the end where the metal runs off from the mould may be cut off, because it is commonly thin, or uneven, or ragged at the end. It must stand very even or level in breadth, and something falling from the end in which the metal is poured in, viz. about an inch, or an inch and a half, in the length of sixteen or seventeen inches. At the upper end of the mould stands the pan, which is a concave triangular prism, composed of two planks nailed together at right angles, and two triangular pieces fitted in between them at the ends. The length of this pan is the whole breadth of the mould in which the sheets are cast; it stands with its bottom, which is a sharp edge, on a form at the end of the mould, leaning with one side against it; and on the opposite side is a handle to lift it up by, to pour out the melted lead; and on that side of the pan next the mould, are two iron-hooks to take hold of the mould, and prevent the pan from slipping, while the melted lead is pouring out of it into the mould. This pan is lined on the inside with moistened sand, to prevent it from being fired by the hot metal. The mould is also spread over, about two thirds of an inch thick, with sand sifted and moistened, which is rendered perfectly level by moving over it a piece of wood called a strike, by trampling upon it with the feet, and smoothing it over with a smoothing plane, which is a thick plate of polished brass, about nine inches square, turned up on all the four edges, and with a handle fitted on to the upper or concave side. The sand being thus smoothed, it is fit for casting sheets of lead; but if they would cast a cistern, they measure out the bigness of the four sides, and having taken the dimensions of the front, or fore-part, make mouldings by pressing long slips of wood, which contain the same mouldings into the level sand, and form the figures of birds, beasts, &c.

by

by pressing in the same manner leaden figures upon it, and then taking them off, and at the same time smoothing the surface where any of the sand is raised up, by making these impressions upon it. The rest of the operation is the same in casting either cisterns or plain sheets of lead: but before we proceed to mention the manner in which that is performed, it will be necessary to give a more particular description of the strike. The strike then is a piece of board about five inches broad, and something longer than the breadth of the mould on the inside; and at each end is cut a notch, about two inches deep, so that when it is used, it rides upon the sharps with those notches. Before they begin to cast, the strike is made ready by tacking on two pieces of an old hat on the notches, or by slipping a case of leather over each end, in order to raise the under side about one eighth of an inch, or something more, above the sand, according as they would have the sheet to be in thickness; then they tallow the under edge of the strike and lay it across the mould. The lead being melted, it is ladled into the pan, in which, when there is a sufficient quantity for the present purpose, the scum of the metal is swept off with a piece of board to the edge of the pan, letting it settle on the sand, which is by this means prevented from falling into the mould at the pouring out of the metal. When the lead is cool enough, which is known by its beginning to stand with a shell or wall on the sand round the pan, two men take the pan by the handle, or else one of them lift it up by a bar and chain fixed to a beam in the ceiling, and pour it into the mould, while another man stands ready with the strike, and, as soon as they have done pouring in the metal, puts on the mould, sweeps the lead forward, and draws the overplus into a trough prepared to receive it. The sheets being thus cast, nothing remains but to planish the edges in order to render them smooth and strait: but if it be a cistern it is beat into four sides, so that the two ends may join the back, where they are soldered together, after which the bottom is soldered up.

The method of casting thin sheets of lead. Instead of sand, they cover the mould with a piece of woollen stuff nailed down at the two ends to keep it tight, and over this lay a very fine linen cloth. In this process great regard is had to the

just degree of heat, so as that the lead may run well and yet not burn the linen. This they judge of by a piece of paper, for it takes fire in the liquid lead if it is too hot, and if it be not shrunk and scorched a little, it is not hot enough. They have here a strike different from that described above: it is a wooden case, only closed on three sides: it is pretty high behind, but the two sides, like two acute angles, still diminish to the tip from the place where they are joined to the third or middle piece, where they are of the same height therewith, *viz.* seven or eight inches high: the width of the middle makes that of the strike, which again makes that of the sheet to the cast. This strike is placed at the top of the mould, which in that part is first covered with a pasteboard that serves as a bottom to the case, and prevents the linen from being burnt while the lead is pouring in. The strike is now filled with lead, according to the quantity to be used; which done, two men, one at each side, draw the strike down the mould with a velocity greater or less, as the sheet is to be more or less thick.

The method of casting pipes without soldering. To make these pipes they have a kind of little mill, with arms or levers to turn it withal. The moulds are of brass, and consist of two pieces, which open and shut by means of hooks and hinges, their inward caliber, or diameter, being according to the size of the pipe to be made, and their length is usually two feet and a half. In the middle is placed a core, or round piece of brass or iron, somewhat longer than the mould, and of the thickness of the inward diameter of the pipe. This core is passed through two copper-rundles, one at each end of the mould, which they serve to close; and to these is joined a little copper-tube about two inches long, and of the thickness the leaden pipe is intended to be of. By means of these tubes the core is retained in the middle of the cavity of the mould. The core being in the mould, with the rundles at its two ends, and the lead melted in the furnace, they take it up in a ladle and pour it into the mould by a little aperture at one end, made in the form of a funnel. When the mould is full they pass a hook into the end of the core, and turning the mill, draw it out; and then opening the mould take out the pipe. If they desire to have the pipe lengthened, they

they put one end of it in the lower end of the mould, and pass the end of the core into it; then shut the mould again, and apply its rundle and tube as before, the pipe just cast serving for rundle, &c. at the other end. Things being thus replaced they pour in fresh metal, and repeat the operation till they have got a pipe of the length required.

For making pipes of sheet-lead, the plumbers have wooden cylinders, of the length and thickness required, and on these they form their pipes by wrapping the sheet around them, and soldering up the edges all along them. See PIPE.

PLUMBUM, LEAD, in natural history.

See the article LEAD.

PLUME, a set or bunch of ostrich-feathers pulled out of the tail and wings, and made up to serve for ornaments in funerals, &c.

Among sportsmen, plume is the general colour or mixture of the feathers of a hawk, which shews her constitution. See the article HAWK.

PLUME, or **PLUMULE**, in botany, a little membrane of the grain or seed of a plant, being that which, in the growth of the plant, becomes the stem or trunk thereof. See the article SEED, &c.

PLUMERIA, RED JASMINE, in botany, a genus of the pentandria-monogynia class of plants, the corolla of which consists of a single funnel-like petal, with a long tube, and divided into five oblong segments at the limb: the fruit is composed of two jointed and ventricose follicles, formed of a single valve each, and containing numerous oblong seeds. See plate CXCIX. fig. 5.

PLUMMET, **PLUME RULE**, or **PLUMB-LINE**, an instrument used by carpenters, masons, &c. in order to judge whether walls, &c. be upright planes, horizontal, or the like. It is thus called from a piece of lead, *plumbum*, fastened to the end of a chord, which usually constitutes this instrument. Sometimes the string descends along a wooden ruler, &c. raised perpendicularly on another; in which case it becomes a level. See LEVEL.

PLUMMING, among miners, is the method of using a mine-dial, in order to know the exact place of the work where to sink down an air-shaft, or to bring an adit to the work, or to know which way the load inclines when any flexure happens in it.

It is performed in this manner: A skilful person, with an assistant, and with

pen, ink, and paper, and a long line and a sun-dial, after his guess of the place above ground, descends into the adit or work, and there fastens one end of the line to some fixed thing in it, then the incited needle is let to rest, and the exact point where it rests is marked with a pen: he then goes on farther in the line still fastened, and at the next flexure of the adit he makes a mark on the line by a knot or otherwise; and then letting down the dial again, he there likewise notes down that point at which the needle stands in this second position. In this manner he proceeds, from turning to turning, marking down the points, and marking the line, till he comes to the intended place; this done, he ascends and begins to work on the surface of the earth what he did in the adit, bringing the first knot in the line to such a place where the mark of the place of the needle will again answer its pointing, and continues this till he comes to the desired place above ground, which is certain to be perpendicularly over the part of the mine into which the air-shaft is to be sunk.

PLUMOSE, something formed in the manner of feathers, with a stem and fibres issuing from it on each side: such are the antennæ of certain moths, butterflies, &c.

PLUNGER, in mechanics, the same with the forcer of a pump. See FORCER.

PLURAL, *pluralis*, in grammar, an epithet applied to that number of nouns and verbs which is used when we speak of more than one thing; or that which expresses a plurality or number of things. See the article NUMBER.

In latin, &c. both nouns and verbs have usually distinct terminations to their different numbers: in English, nouns substantive usually become plural by the addition of *s*, or *es*, to the singular. Nouns adjective are the same in both numbers; and in verbs the number is distinguished by that of the pronouns or persons.

PLURALITY, *pluralitas*, a discrete quantity, consisting of two or a greater number of the same kind: thus we say a plurality of gods, &c.

Hence plurality of benefices, or livings, is where the same clerk is possessed of two or more spiritual preferments, with cure of souls. In a plurality of livings, the first, *ipso facto*, becomes void; on which account, the patron may present to it, provided the clerk be not qualified by

by dispensation, &c. to hold more livings than one, in regard the law strictly enjoins residence; this being impossible where the same person has more than one living, in different places. As the power for granting dispensations for the holding two benefices, &c. is vested in the king, it is held that, in these cases, the archbishop's dispensation, and the king's confirmation of it, are necessary to hold pluralities: but a deanery shall not be taken to be a benefice, so as to need a dispensation, on the dean's having another spiritual preferment; also a parsonage and vicarage make no plurality.

PLURIES, in law, the name of a writ which issues after two former writs have gone out without any effect; for first, an original writ, called a *capias*, goes out, which not being obeyed, there goes out an alias, which likewise failing, the pluries issues.

PLUS, in algebra, a character marked thus +, used for the sign of addition. See the article **CHARACTER**.

PLUSH, in commerce, &c. a kind of stuff having a sort of velvet knap, or shag, on one side, composed regularly of a woof of a single woollen thread and a double warp, the one wool, of two threads twisted, the other goats or camels hair; though there are some plushes entirely of worsted, and others composed wholly of hair.

Plush is manufactured, like velvet, on a loom with three treadles; two of these separate and depress the woollen warp, and the third raises the hair warp, upon which the workman throwing the shuttle, passes the woof between the woollen and hair-warp; and afterwards laying a brass-broach, or needle, under that of the hair, he cuts it thereon with a knife destined for that use; conducting the knife on the broach, which is made a little hollow all its length, and thus gives the surface of the plush an appearance of velvet. See **VELVET**.

There are other kinds of plush, all of silk; some of which have a pretty long knap on one side, and some on both.

PLUSQUAMPERFECT, in grammar. See the article **PRETERIT**.

PLUVIAL, *pluviale*, antiently signified a hood or cloak, which ecclesiastics, chiefly religious, wore in the country to shelter themselves from the rain. The word is now used, in the romish church, for a large hood worn by the chanter and

subdeacon at mass and vespers, &c. It covers the whole man, and is fixed before with two clasps.

PLUVIALIS, in zoology, the name whereby the latin authors call the plover. See the article **PLOVER**.

PNEUMATICS, called also **PNEUMATOLOGY** and **PNEUMATOSOPHY**, among schoolmen, the doctrine and contemplation of spirits and spiritual substances, as God, angels, and the human soul, in which sense pneumatics are the same with what we otherwise call metaphysics. See the article **METAPHYSICS**.

PNEUMATICS is more commonly used among us, for that part of natural philosophy which treats of the nature and properties of the air; the doctrine and laws of which will be found under the articles **AIR**, **ATMOSPHERE**, **PRESSURE**, **ELASTICITY**, **GRAVITY**, **COMPRESSION**, **RAREFACTION**, **EXPANSION**, **FLUID**, &c.

PNEUMATIC ENGINE. See **AIR-PUMP**.

PNEUMATOCELE, *hernia flatulenta*, or **WINDY RUPTURE**, in surgery and medicine, a species of hernia, which several authors assure us occurs in practice. The signs by which they tell us it may be discovered are, 1. That upon handling the scrotum it feels like a bladder distended with wind; and that, therefore, 2. it seems to be much lighter than if it contained any humour, appearing also pellucid at the approach of a candle; and, 3. if it be struck by a fillup of the finger, it sounds like a bladder which is distended with wind, and struck in the same manner. However, Heister is of opinion that these authors have mistaken either the hydrocele or enterocele for the pneumatocèle, and seems to be more confirmed in this opinion, not only because the symptoms and cure of this disorder, with which they acquaint us, agree exactly with these of the hydrocele, but because that in all his practice he never observed any thing like this disorder; this makes him at least suspect that the case does not so often occur as some would insinuate: but whenever it is met with, he directs to proceed in the cure as follows. Let the tumour be treated externally with warm and discutient medicines, as in the hydrocele; together with fomentations and plasters; and internally may be taken carminative and gentle purges: but if these take no effect, and the tumour still increases, or continues the same, the scro-

tum should then be perforated with the trochar, and its contents thereby discharged, which will demonstrate whether it be wind or water.

PNEUMATOMACHI, πνευματομαχοι, ancient heretics, so called because they opposed the divinity of the holy spirit, placing him in the number of creatures.

PNEUMATOSIS, πνευματώσις, a term which some authors use for the generation or formation of animal spirits in the brain.

PNEUMONICS, in pharmacy, medicines proper in diseases of the lungs, in which respiration is affected. Of this number are sulphur, lungwort, hyssop, ground-ivy, and colt's-foot: they are used in phthises, asthmas, peripneumonies, pleurifies, &c.

PO, a great river of Italy, rising in the Alps, and running first east, soon after turns directly north, through Piedmont, where it receives the Doria: then passing north-east, it discharges itself by several channels into the gulph of Venice.

POA, MEADOW-GRASS, in botany, a genus of the triandria-digynia class of plants, the corolla whereof is composed of two valves, of an ovato-acuminated figure, hollow, compressed, and somewhat longer than the cup, and without awns. It supplies the place of a pericarpium; and adheres every way to the seed, which is single, of an oblong figure, compressed, and pointed at each end.

This is the most common of all grasses with us, and makes principally the green covering of most of our fields and meadows.

POCHARD, in ornithology, the anas, with grey wings and a black rump. See the article **ANAS**.

POCK. See the article **POX**.

POCKET, in the woolen trade, a word used to denote a large sort of bag, in which wool is packed up to be sent from one part of the kingdom to another. The pocket contains usually twenty-five hundred weight of wool.

POCKET-instruments and medicines, in surgery. See the articles **INSTRUMENT** and **MEDICINES**.

POCKLINGTON, a market-town in the east riding of Yorkshire: situated twelve miles south-east of York.

POD, among botanists, a term used to express a pericarpium, consisting of two valves, which open from the base to the point, and are separated by a membranaceous partition, from which the seeds

hang by a kind of funiculus umbilicalis.

See the article **PERICARPIUM**.

PODAGRA, in medicine, the gout in the feet. See the article **GOUT**.

PODALIA, a province of Poland, bounded by Volhinia and the russian Ukrain, on the north and north-east; by Budziac Tartary, on the south-east; by the river Niester, which separates it from Bessarabia and Moldavia, on the south-west; and by the province of red-Russia, on the north-west.

PODOMETER, or **PEDOMETER**, the same with perambulator. See the article **PERAMBULATOR**.

PODARIA, in zoology, a division, order, or series of wingless insects, with short bodies, and not very numerous legs; comprehending the puceron, pediculus, acarus, spider, squill, &c. See the article **PUCERON**, &c.

PODENSTEIN, a town of Germany, in the circle of Franconia: situated in east long. 11° 35', north lat. 49° 50'.

PODERIS, in antiquity, a robe hanging down to the foot, but chiefly used to express a linen garment, a surplice, or a shirt.

The jewish priests were covered with this kind of surplice during their attendance in the temple; this being the proper habit of their order.

PODEX, in anatomy, &c. the same with anus or fundament. See **ANUS**.

PODOPHYLLUM, the **MAY-APPLE**, in botany, a genus of the polyandria-mono-gynia class of plants, the flower of which consists of nine hollow and rounded petals, folded or plicated at the rim, and smaller than the cup: the fruit is an unilocular capsule of an oval figure, containing numerous and roundish seeds.

This plant is otherwise called anapodophyllum. See the article **ANAPODOPHYLLUM**, and plate **XVII**. fig. 2.

PODURA, the **PUCERON**, in zoology. See the article **PUCERON**.

POEM, Ποιμα, a composition in verse of a due length and measure. See the articles **VERSE** and **MEASURE**.

Poems are generally denominated from the subject matter, as the apobaterion, epibaterion, epinicion, epithalamium, genethliac, elegiac, satiric, epitaph, panyric, lyric, pastoral, &c. and others from the manner of narration, as epic, dramatic, &c. to which may be added, odes, eclogues, and idylliums. To this head may also be referred several other compositions of a less serious kind, as the

the acrostic, enigma, anagram, cento, echo, &c. See each under its proper head: APOBATERION, &c.

The Abbé Du Bos observes, in regard to poems, that some are interesting in general, others in particular; that the beauties of execution alone do not constitute a good poem; that the defects of poems are less discernable than those of a picture; that our dislike falls only on the bad part of a poem; that every kind of poem has something particular in its style; that by the beauty of the style we must judge of poems; that it must be a long time before the merit of a good poem is distinguished; and finally, that the character of the poetic style has always decided the good or bad success of poems, even of those which by their length seem to have the greatest dependance on the œconomy of the plan, on the distribution of the action, and on the decency of the manners.

POESY, the same with poetry. See the article POETRY.

POET, *ποιητης*, the author of a poem. See the article POEM.

Homer, Virgil, Milton, and Tasso, are reckoned the chief, almost the only, epic poets. Sophocles, Euripides, Shakspeare, Otway, Corneille, and Racine, the best tragic poets. Aristophanes, Menander, Plautus, Terence, Fletcher, Johnson, Moliere, &c. the chief comic poets. Horace, Cowley, and Malherbe, excelled as lyric poets; and Juvenal, Persius, Regnier, Boileau, Dryden, and Oldham, as satiric poets.

POETICAL, something that relates to poetry or poets, in which sense we say poetical genius, poetical licence, &c.

POETICAL *Justice*, is chiefly used in respect of the drama, to denote a distribution of rewards and punishments to the several persons at the catastrophe or close of a piece, answerable to the several characters they appeared in. See the articles CHARACTER and CATASTROPHE.

POETICAL *rising and setting of the stars*. The three kinds of rising and setting, *viz.* the cosmical, acronical, and helical, were made by the antient poets, referring the rising, &c. of the stars to that of the sun. See COSMICAL, &c.

POETICS, the doctrine of poetry, or the laws and rules of conducting pieces, or compositions of poetry, such is Aristotle's poetics, a work much valued.

POETRY, the art of composing poems,

or pieces in verse; or, as defined by Vossius, the art of representing actions in metre.

Vossius thinks that love was the first occasion of poetry, which is not improbable, considering that this affection is coeval with mankind, is universal, and naturally productive of poetry; yet it undoubtedly owes its increase and progress to religion: Dacier indeed calls it the offspring of religion; and it is certain, in the earliest ages of the world, that it was usual to sing hymns to the honour of the gods upon solemn festivals. Du Bos thinks that poetry has been employed in all ages, even by the most unpolished nations, to preserve the memory of past events. Its principal aim is to flatter our senses and imagination: for, according to Plato, it awakes the spiritual empire of the soul. Every kind of poetry charms us in proportion to its object, says Du Bos; and to be very affecting, it ought to be very exact. It is not the same with poetry as with other arts, for an ignorant person may judge of poetry by the impression it makes on him: whence all men have a right to give their opinion concerning a piece of poetry, and this judgment ought to be founded on experience rather than on argumentation. Poetry is an art where every thing should please. It is not enough to exhibit nature, which in certain places and circumstances is rude and unpleasant, but the poet must chuse in her what is beautiful from what is not: whence a poet ought to chuse, for the subject of his imitation, something that is naturally affecting. There is a particular rhetoric for poetry, which consists in discerning very precisely what ought to be said figuratively, and what to be spoken simply; and in knowing where ornament is required, and where not: yet the style should be copious, and every species of writing in this art should have a diction proper to itself. The qualifications then necessary for poetry, or those which form a good poet, are seldom found united in one person: he must have an extraordinary genius, great natural gifts, a wit just, piercing, solid, and universal; an understanding clear and distinct; an imagination neat and pleasant; an elevation of soul that depends not on art, or study, and which is purely a gift of heaven, and must be sustained by a lively sense and vivacity, a great judgment to consider wisely of things, and

and a vivacity, to express them with that grace and abundance which gives them beauty. In fine, to accomplish a poet, is required a temperature of wit and fancy, of strength and sweetness, of penetration and delicacy; but, above all, he must have a sovereign eloquence, and a profound capacity. These are the qualities that must concur together to form the genius of a poet, and sustain his character. The rules of poetry and versifying are taught by art, and acquired by study; but this force and elevation of thought, which Horace calls something divine, and which alone makes the poetry of any value, must be derived from nature; or, according to Aristotle, from some happy transports, to which that author gives the name of madness. Hence the critics conclude, the end of poetry is to please; its cause, either the excellence of the poet's genius, or a poetical fury and transport of the soul, manageable by the judgment; its matter, long and short syllables, and feet composed hereof, with words furnished by grammar; and its form the arrangement of all these things in just and agreeable verse, expressing the thoughts and sentiments of the author after the manner already mentioned. But after all, how narrow are all these bounds, if we consider poetry in the light wherein the works of Homer and Virgil have set it. This, which is therefore distinguished by the name of the greater poetry, in contradistinction to the low and simple, or versification, consists principally in fiction, or the invention of fables, in the expressing of things by allegories, and metaphors, and in the inventing of actions, under which the truths which the poet has to teach, may be agreeably disguised. See MYTHOLOGY, &c.

The laws of epic and dramatic poetry, see under the articles EPIC, CHARACTER, INVOCATION, CATASTROPHE, DRAMATIC, ACT, SCENE, SENTIMENTS, &c.

For the lower sorts of poetry, see the articles ODE, SONG, EPIGRAM, ELEGY, SATYR, &c.

POGGE, *cataphractus*, in ichthyology. See the article CATAPHRACTUS.

POGGIO IMPERIAL, a city of Italy, in the dutchy of Tuscany, situated sixteen miles south of Florence.

POICTIERS, the capital of Poictou, in France, situated on an eminence, near the river Clain: east long. 15°, north lat. 46° 40'.

POICTOU, a territory of France, in the province of Orleanois, situated south of the river Loire, being bounded by the provinces of Anjou and Britany on the north, by Touraine and Berry on the east, by Santoign, Angoumois, and Aunis on the south, and by the ocean on the west. It is one hundred and fifty miles long, and seventy broad.

POINCIANA, in botany, a genus of the decandria-monogynia class of plants, the corolla whereof consists of five unequal petals; the four upper petals are roundish and nearly equal, the fifth is larger, difform, and crenated; the fruit is an oblong depressed pod, with septa; the seeds are single, and placed lengthwise in the pod. See plate CCXI. fig. 2.

POINSON, in the manege, a little point, or piece of sharp-pointed iron, fixed in a wooden-handle, which the cavalier holds in his right hand, when he means to prick a leaping horse in the croup, or beyond the end of the saddle, in order to make him jerk out behind.

POINT, a term used in various arts.

POINT, *punctum*, in geometry, as defined by Euclid, is a quantity which has no parts, or which is indivisible. Points are the ends or extremities of lines. If a point be supposed to be moved any way, it will, by its motion, describe a line. See the article LINE.

POINT of *contrary flexure*. See the article FLEXURE.

POINT, in physics, the least sensible object of sight, marked with a pen, point of a compass, or the like. Of such points all physical magnitude consists. This physical point is the same with what Mr. Locke calls the point sensible, and which he defines to be the least particle of matter, or space, we can discern. He adds, that to the sharpest eye, this is seldom less than thirty seconds of a circle, whereof the eye is the center.

POINT, in grammar, a character used to mark the divisions of discourse. A point proper, is what we otherwise call a full stop or period. See PERIOD.

For the other points, see the articles COMMA, COLON, and SEMICOLON.

For the points of interrogation and admiration, see the articles INTERROGATION and ADMIRATION.

The points, or vowel points, in the hebrew grammar, are certain characters which, in the writings of that language, serve to mark the vowels. The antiquity of these points make the subject of a cele.

celebrated controversy, some maintaining their origin to be the same with that of the hebrew language; and others asserting them to have been first introduced by Eldras, after the babylonish captivity, when he compiled the canon, transcribed the books into the present chaldee character, and restored the purity of the hebrew text. Some will have them invented by the doctors of the school of Tiberias, usually called the massoretes, five or six hundred years after Christ.

POINT, in music, a mark or note antiently used to distinguish the tones or sounds: hence we still call it simple counter-point, when a note of the lower part answers exactly to that of an upper; and figurative counter-point, when any note is syn-copated, and one of the parts makes several notes or inflections of the voice, while the other holds on one. See the article **COUNTER-POINT**.

We still use a point, to raise the value of a note, and prolong its time by one half, e. g. a point added to a semibreve instead of two minims, make it equal to three; and so of the other notes. See **TIME**.

POINT, in astronomy, a term applied to certain points or places, marked in the heavens, and distinguished by proper epithets.

The four grand points or divisions of the horizon, viz. the east, west, north, and south, are called the cardinal points. See **HORIZON**, **EAST**, **WEST**, &c.

The zenith and nadir are the vertical points; the points wherein the orbits of the planets cut the plane of the ecliptic, are called the nodes: the points wherein the equator and ecliptic intersect, are called the equinoctial points; particularly, that whence the sun ascends towards the north pole, is called the vernal point; and that by which he descends to the south pole, the autumnal point. The points of the ecliptic, where the sun's ascent above the equator, and descent below it, terminate, are called the solsticial point; particularly the former of them, the estival or summer-point; the latter, the brumal or winter-point.

POINT of the horizon, or *compass*, in navigation and geography. See the articles **HORIZON** and **COMPASS**.

POINT is also used for a cape or headland, jutting out into the sea; thus seamen say, two points of land are in one another, when they are so in a right line against each other, as that the innermost is hindered from being seen, by the outermost.

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POINT, in perspective, is used for various parts or places, with regard to the perspective plane. See **PERSPECTIVE**.

POINTS, in heraldry, are the several different parts of an escutcheon, denoting the local positions of any figure. There are nine principal points in an escutcheon as represented in pl. CCV. fig. 3, where A shews the dexter chief; B, the precise middle chief; C, the sinister chief; D, the honour-point; E, the fess-point, called also the center; F, the nombril-point, that is, the navel-point; G, the dexter base; I, the sinister base; H, the precise middle base.

Columbier makes the points and their situations symbolical. As the several bearings in an escutcheon are so many types representing the commendable actions of the person they are given to, so the escutcheon itself represents the body of the man that performed them; and the points or parts signified by these letters, the principal parts of his body: thus A, B, C, represent the head, in which the three great faculties reside; D, the neck, where ornaments are chiefly borne; E, the heart, &c. See **ESCUTCHEON**.

Point is also the name of an ordinary, something like a pile, rising frequently from the bottom of the escutcheon to the top, very narrow, and only taking up two thirds of the point of the escutcheon. When the point arises from the base, it is peculiarly called point in point. Point inverted, is when it descends from the chief downwards, possessing two thirds of the chief, but diminishing as it approaches the point of the escutcheon, though without touching it. Point in bend, or point in bar, is when the point is placed transverse in the situation of a bend or bar. When it comes from the sides of the escutcheon, it is also called the point dexter or sinister, according to its situation. The point dexter is commonly reputed an abatement due to a braggadocio; point-champion-ten, due for killing a prisoner after quarter demanded; point in point, a diminution belonging to a coward; point-plane, an abatement belonging to a liar, &c. See the articles **DIMINUTION**, &c.

POINT is also used in heraldry for the lowest part of the escutcheon, which usually terminates in a point.

POINT-CHAMPAIN. See **CHAMPAIN**.

POINT is also an iron or steel-instrument, used with some variety in several arts. Engravers, etchers, cutters in wood, &c.

use points to trace their designs on the copper, wood, stone, &c. See the articles ENGRAVING, &c.

POINT, in the manufactories, is a general term, used for all kinds of laces, wrought with the needle; such are the point de Venice, point de France, point de Genoa, &c. which are distinguished by the particular oeconomy and arrangement of their points.

Point is sometimes used for lace woven with bobbins, as english point, point de Malines, point d'Havre, &c.

POINT, in architecture, See ARCH.

POINT, in poetry, denotes a lively brisk turn, or conceit, usually found or expected at the close of an epigram.

POINT-BLANK, in gunnery, denotes the shot of a gun, levelled horizontally. See the article GUNNERY.

POINTED, in heraldry. A cross pointed, is that which has the extremities turned off into points by straight lines.

POINTING, in grammar, the art of dividing a discourse, by points, into periods and members of periods, in order to shew the proper pauses to be made in reading, and to facilitate the pronounciation and understanding thereof. See the articles PUNCTUATION and PRONUNCIATION.

POINTING, in war, the levelling a cannon, or mortar, so as to play against any certain point. See the articles GUNNERY, QUADRANT, &c.

POINTING, among seamen, marking on the chart in what part or place the vessel is.

POINTING the cable, in the sea-language, is untwisting it at the end, lessening the yarn, twisting it again, and making all fast with a piece of marline, to keep it from ravelling out.

POIRINO, or **POVERINO**, a town of Italy, in the province of Piedmont, fifteen miles south-east of Turin.

POISON, in medicine, a malignant quality in some animal, vegetable, or mineral body, which renders it hurtful and even mortal to those who take it.

There are three essential marks of poisons, which distinguish them from other things that are noxious to human bodies. The first is, that they consist of most subtle parts, and are consequently pernicious in a small quantity. The second, that they in a short time prevent the regular motions of the solids and fluids throughout the body, and induce the most grievous symptoms, and even death itself. And the third, that they exercise their cruelty on the most subtle fluids, and

the most nervous parts. Poisons are of various kinds, and operate in various manners; some by dissolving the blood, others by coagulating it, and others by corroding and destroying the solid parts. All the three kingdoms have poisons peculiar to themselves; but the animal kingdom affords the most subtle, which are communicated by the bite of mad or venomous beasts, when they are angered. The mineral kingdom produces arsenicals and mercurials. And the vegetable, herbs and plants of a most acrid, noxious, and deleterious quality, such as the most violent cathartics and narcotics. Every sort of poison seems to have an effect peculiar to itself; thus arsenic occasions the most cruel torments, convulsions, mortification of the coats of the intestines: the seeds of datura induce madness or absolute stupidity: opium brings on sleepiness, and a torpor on the mind: the berries of deadly nightshade produce madness, rage, or folly: litharge, unwarily taken, causes a convulsive colic, with an obstinate costiveness: the bite of a mad dog occasions the dread of water: the venom induced by the sting of a tarantula, produces wonderful effects; for the patient is delighted with musical instruments, and when he hears their sounds, immediately falls to capering: the sting of a scorpion produces a sudden chillness and exceeding cold sweats. The mineral kingdom furnishes very few real poisons; the only natural one is cobalt; the factitious are arsenic, corrosive sublimate, and glass of antimony. The most dangerous vegetable poisons are the true hemlock, wolf's bane, the deadly nightshade, henbane, and datura, to which may be added the roots of hemlock-dropwort. Milk mixed with oil, is an excellent remedy against all corrosive poisons. Hoffman says, that he once prevented the death of ten young persons, who had taken among them almost two ounces of arsenic in water gruel, which in a short time produced the highest anxieties, and corroding tortures, by oil of sweet almonds and milk. They took at least ten quarts a piece, which they vomited up again before the reaching to vomit ceased. The same author also affirms, that milk, in a large quantity, is an universal remedy against all poisons that kill by inflammation, as hemlock does; and, if taken in time, will prevent their dreadful consequences. Allen thinks a vomit with warm water and oil, taken in large draughts,

draughts, and often repeated, will be of great service; as also warm water with fresh butter; milk and oil, or milk and butter: but for fat broths, which he also recommends, or any thing else which requires some time for the preparation, they only allow the poison to take deeper root; and therefore ought not to be waited for. If the above things will not provoke the patient to vomit, oxymel of squills, salt of vitriol, or a decoction of tobacco may be used, as having a more immediate effect. It is hardly safe to give even the most gentle cathartic. The stomach being thus emptied of all, or as much as possible of the hemlock, recourse must be had to generous wine and alexipharmics, such as venice treacle, the bezoardic powder, &c. When there is a suspicion that the coats of the stomach or intestines are corroded, or ulcerated, it will not be proper for the patient to use spices or vinegar, nor to indulge in drinking too much wine; but to take a decoction of barley with raisins, or a decoction of china-root, saffra, &c. The same method is most likely to answer when any deleterious herb or root has been eaten by mistake, though the particular species should not be known: and Hoffman affirms, that when the patient has been stupified by narcotics, the best remedies are vomits mixed with oil. For the more effectual remedies for the bite of a mad dog, viper, rattle-snake, &c. see the articles HYDROPHOBIA, VIPER, RATTLE-SNAKE, &c.

To POISON a piece, with gunners, is the same as to clog and nail it up.

POISON-OAK, *toxicodendron*, in botany. See the article TOXICODENDRON.

POISSY, a town of France, fifteen miles north-west of Paris.

POLA, a port town of Istria, ninety miles south-east of Venice.

POLACHIA, a province situated in the middle of Poland, on the river Bug, eastward of Masovia or Warsovia.

POLAEDRASTYLA, in natural history, the name of a genus of crystals, composed of many planes, and having no column. See the article CRYSTAL.

The bodies of this genus are crystals composed of two octangular pyramids, joined base to base, and consequently the whole body consisting of sixteen planes. Of this genus there are only two known species. 1. A brown kind, with short pyramids, found in considerable plenty in Virginia on the sides of hills. And,

2. A colourless one, with longer pyramids. This has yet been found only in one place, which is the great mine at Gosselaer, in Saxony, and there usually lies at great depths.

POLAND, a large kingdom of Europe, situated between 16° and 34° east longitude, and between 46° and 57° north latitude; bounded by Russia on the north and east; by Bessarabia, Moldavia, Transylvania, and Hungary on the south; and by Pomerania, Brandenburg, and Silesia on the west; being almost square, and seven hundred miles over either way.

The constitution of Poland is a mixed monarchy, in which the nobility and gentry seem to have the greatest share, whence it is frequently called a republic. The king is elective by the whole body of the gentry, who oblige him to swear to what conditions they please.

POLAR, in general, something relating to the poles of the world, or poles of the artificial globes: thus we meet with polar circles, polar dial, polar projection, &c. See the articles CIRCLE, DIAL, &c.

POLARITY, the quality of a thing considered as having poles; but chiefly used in speaking of the magnet. See the article MAGNET.

POLE, *πολος*, in astronomy, one of the extremities of the axis, on which the sphere revolves. See SPHERE and AXIS.

These two points, each 90° distant from the equinoctial or equator, are by way of eminence called the poles of the world; and the extremities of the axes of the artificial globes, corresponding to these points in the heavens, are termed the poles thereof. See the article GLOBE.

POLE, in spherics, a point equally distant from every part of the circumference of a great circle of the sphere, as the center is a plane figure; or it is a point of 90° distant from the plane of a circle, and in a line, called the axis, passing perpendicularly through the center. The zenith and nadir are the poles of the horizon; and the poles of the equator are the same with those of the sphere.

POLES of the ecliptic, are two points on the surface of the sphere, $23^{\circ} 30'$ distant from the poles of the world, and 90° distant from every part of the ecliptic. See the article EARTH.

POLES, in magnetics, are two points of a loadstone, corresponding to the poles of the world; the one pointing to the north, the other to the south. See MAGNET.

POLE, or VERTEX of a glass, in optics, is

the thickest part of a convex, or the thinnest of a concave-glass. If the glass be truly ground, the pole will be exactly in the middle of its surface.

POLE, PERCH, or ROD, in surveying, is a measure containing sixteen feet and a half.

POLE, or POLAR STAR, is a star of the second magnitude, the last in the tail of *ursa minor*. Its longitude Mr. Flamsteed makes $24^{\circ} 14' 41''$; its latitude, $66^{\circ} 4' 11''$.

The nearness of this star to the pole, whence it happens that it never sets, renders it of vast service in navigation, &c. for determining the meridian line, the elevation of the pole, and, consequently, the latitude of the place, &c. See the article **LATITUDE**.

POLE-CAT, *putorius*. See **PUTORIUS**.

POLEMICAL, in matters of literature, an appellation given to books of controversy, especially those in divinity.

POLEMONY, *polemonium*, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous flower, divided into five roundish segments at the limb: the fruit is a roundish capsule, consisting of three cells, and containing a great many seeds in each.

The leaves of this plant are accounted deterfive.

POLEMOSCOPE, in optics, a kind of reflecting perspective-glass invented by Hevelius, who commends it as useful in sieges, &c. for discovering what the enemy is doing, while the spectator lies hid behind an obstacle. See **PERSPECTIVE**. Its description is this: the interval *bc*, (pl. CCVII. fig. 1.) between the object-glass and the speculum, is enlarged by a tube, of a length sufficient to project the speculum beyond the obstacle that covers the observer. And for a further convenience of looking forward, as it were, he proposes to place another plane speculum *fg*, at the other end of the tube, to reflect the rays through a hole *kl* in its sides, in a direction *ao*, parallel to the incident rays *Qc*; and to place the concave eye-glass in this hole. By this means, the object will still appear upright, and magnified just as much as if the two speculums were removed, and the same eye-glass was placed in the axis of the tube: for in the rays *Qc*, *oa*, produced through the speculums *de*, *fg*, take *ci = cb*, and *ab = ab*; and supposing rays to flow both ways through *b*, the center of the object-glass, after re-

flection from the speculums they will diverge from the points *b*, *i*. Let two of them fall upon the object at *P* and *R*, and since $\angle P i R$ (or *die*) = $\angle d b e$ (or *fbg = fbb*) if the eye-glass was removed, the object would appear under the same angle *fbg* or *kbl*, as it would appear under to the naked eye placed at *i*; but the reflected rays *fk*, *gl*, after refractions into *km*, *ln*, through the eye-glass *kl*, are inclined in the same angle to each other, as they would be if the speculum *fg* being removed they had been refracted through the same eye-glass placed in the axis of the tube, at the same distance from *b* as it is now from *b*: and by tracing an oblique ray, *Reb fkm*, it is manifest that the object appears upright; it also appears in the same posture, with respect to right and left, as to the naked eye. However, the length of the perspective *ab* must not be very great, otherwise it will take in so little at one view, as to make it difficult to find an object.

POLERON, one of the Banda, or nutmeg-islands, in the Indian-ocean: east long. 128° , south lat. 4° .

POLESIA, a province of Poland, bounded by Polachia and Lithuania, on the north; and by Volhinia, on the south.

POLESIN DE ROVIGO, a province of Italy, situated north of the Po, on the gulph of Venice.

POLESWORTH, a market-town, twenty miles north of Warwick.

POLIANTHES, in botany, a genus of the hexandria-monogynia class of plants, with a monopetalous, funnel-fashioned flower; and a roundish capsule for its fruit, with a great many semi-orbiculated seeds.

POLICANDRO, an island of the Archipelago, in east longitude 25° , north latitude $36^{\circ} 30'$.

POLICASTRO, a bishop's see of the kingdom of Naples, sixty miles south-east of Naples.

POLICY, or POLITY, in matters of government. See the article **POLITY**.

For policies of assurance, or insurance, on ships, houses, lives, &c. see the article **INSURANCE**.

These contracts of insurance, termed policies, are now made either at public or private offices; the insurances made on lives or liberties must be paid according to the tenor of the agreement, because these sorts of policies admit of no average. Where the words of a policy are,

"the ship warranted to depart with convoy," it shall be intended that she keep with convoy during the voyage, if possible; and if she depart willingly from the convoy, it is fraud. Either suppressing the truth, or alleging any falsehood, is sufficient to discharge the policy; it being a general rule, that the insured shall inform the insurer of all material circumstances which have come to his knowledge at the time of making the policy, in order that the contract may be fairly adjusted.

POLICY, among letter-founders, denotes a certain proportion, observed among the letters that compose a font; or a rule, whereby to regulate the number of each. See the articles **LETTER** and **FONT**.

POLISHER, or **BURNISHER**, among mechanics, an instrument for polishing and burnishing things proper to take a polish. The gilders use an iron-polisher to prepare their metals before gilding, and the blood-stone to give them the bright polish after gilding.

The polisher used by the makers of spurs and bits, &c. is partly iron, partly steel, and partly wood; it consists of an iron-bar with a wooden handle at one end, and a hook at the other, to fasten it to another piece of wood held in the vice, while the operator is at work. In the middle of the bow, within side, is what is properly called the polisher, being a triangular piece of steel with a tail, whereby it is riveted to the bow.

The polishers, among cutlers, are a kind of wooden wheels made of walnut-tree, about an inch thick, and of a diameter at pleasure, which are turned round by the great wheel; upon these they smooth and polish their work with emery and putty.

The polishers for glass consist of two pieces of wood; the one flat, covered with old hat, the other long and half-round, fastened on the former, whose edge it exceeds on both sides by some inches, which serve the workmen to take hold of, and to work backwards and forwards by.

The polishers, used by spectacle-makers, are pieces of wood a foot long, seven or eight inches broad, and an inch and a half thick, covered with old beaver-hat, whereon they polish the shell and horn-frames their spectacle-glasses are to be set in.

POLISHING, in general, the operation of giving a gloss or lustre to certain sub-

stances, as metals, glass, marble, &c. See the articles **METAL**, **GLASS**, &c.

The operation of polishing optic-glasses, after being properly ground, is one of the most difficult points of the whole process. See **GLASS** and **GRINDING**.

Before the polishing is begun, it is proper to stretch an even well-wrought piece of linen over the tool, dusting thereupon some very fine tripoli. Then taking the glass in your hand, run round forty or fifty times upon the tool, to take off the roughness of the glass about the border of it. This cloth is then to be removed, and the glass to be polished upon the naked tool, with a compound powder made of four parts tripoli mixed with one of fine blue vitriol; six or eight grains of which mixture, is sufficient for a glass five inches broad. This powder must be wetted with eight or ten drops of clear vinegar, in the middle of the tool; being first mixed and softened thoroughly with a very fine small mullet. Then with a nice brush, having spread this mixture thinly and equably upon the tool, take some very fine tripoli, and strow it thinly and equably upon the tool so prepared; after which take the glass to be polished, wiped very clean, and apply it on the tool, and move it gently twice or thrice in a straight line backwards and forwards; then take it off, and observe whether the marks of the tripoli, sticking to the glass, be equably spread over the whole surface thereof; if not, it is a sign that either the tool or glass is too warm; in which case, you must wait a while and try again, till you find the glass takes the tripoli every where alike. Then you may begin to polish boldly, there being no danger of spoiling the figure of the glass, which in the other case would infallibly happen. This is Mr. Huygens's method; but it ought to be observed, that almost every operator has a peculiar one of his own, and of which some of them make a mighty secret.

Sir Isaac Newton nowhere expressly describes his method of polishing optic-glasses; but his method of polishing reflecting metals, he thus describes in his optics. He had two round copper-plates, each six inches in diameter, the one convex the other concave, ground very true to one another. On the convex one he ground the object-metal, or concave which was to be polished, till it had taken the figure of the convex, and was ready for a polish.

polish. He then pitched over the convex very thinly, by dropping melted pitch upon it, and warming it to keep the pitch soft, whilst he ground it with the concave copper wetted to make it spread evenly all over the convex, till it was no thicker than a groat piece; and after the convex was cold, he ground it again, to give it as true a figure as possible. He then ground it with very fine putty, till it made no noise; and then upon the pitch he ground the object-metal with a brisk motion for two or three minutes; when laying fresh putty upon the pitch, he ground it again till it had done making a noise, and afterwards ground the object-metal upon the pitch as before: and this operation he repeated, till the metal was perfectly polished.

POLITICAL, in general, something relating to policy or government. See the article **GOVERNMENT**.

Political arithmetic is the application of arithmetical calculation, to political subjects, as the public revenues, number of people, extent and value of lands, taxes, trade, manufactures, &c. of any commonwealth.

The calculations of this kind, which Sir William Petty attempted, Dr. Davenant gives some good reasons why many of his numbers are not to be entirely depended on; and therefore he advances others of his own, founded on the observation of Mr. Greg. King.

The land of England, he says, is 39 millions of acres; the number of people about 5,545,000, increasing about 9000 every year, allowance being made for plagues, &c. wars, shipping, plantations. The people in London he reckons at 530,000; those in the other cities and market towns, 870,000; and those in the villages and hamlets, at 4,100,000; the yearly rent of the land he accounts to be 10,000,000*l.* that of the houses and buildings, 2,000,000*l.* *per annum*; the produce of all kinds of grain, he reckons to be worth 9,075,000*l.* in a moderate plentiful year; the rent of the corn lands annually 2,000,000*l.* and their net produce above 9,000,000*l.* the rent of the pastures, meadows, woods, forests, commons, heaths, &c. 7,000,000*l.* The annual produce in butter, cheese, and milk, about 2,500,000*l.* The value of wool, yearly shorn, about 2,000,000*l.* Of horses yearly bred, about 250,000*l.* Of the flesh yearly consumed, about 3,350,000*l.* Tallow and hides, about

600,000*l.* Hay yearly consumed by horses, 1,300,000*l.* By other cattle, 1,000,000*l.* The timber yearly felled for building, 500,000*l.* Wood yearly burnt, &c. 500,000*l.* The land of England is now about seven acres one quarter to each inhabitant. The value of the wheat, rye, and barley, necessary for the sustenance of England, at least, 6,000,000*l.* *per ann.* The value of the woollen manufacture made here is about 8,000,000*l.* *per annum*, and our exports of all kinds of woollen manufactures, above 2,000,000*l.* *per annum*. The annual income of England, on which the people live, and out of which taxes of all kinds are paid, is now about 43,000,000*l.* that of France, 81,000,000*l.* and Holland, 18,250,000*l.*

Major Grant, in his observations on the bills of mortality, computes that there are 39,000 square miles of land in England; that in England and Wales there are 4,600,000 souls; that the people of London are about 640,000, and one fourteenth part of the people of England. That in England and Wales are about 10,000 parishes, and 25 millions of acres being about 4 acres to every head. That but 64 out of a hundred of the children born are living at 6 years old; but 40 at 16; but 25 at 26; but 16 at 36; but 10 at 46; but 6 at 56; but 3 at 66; but 1 at 76. And that London doubles itself in about 64 years.

Sir William Petty, in his discourse about duplicate proportion, says, that it is found by experience that there are more persons living between 16 and 26, than of any other age; and thence he infers, that the square roots of every number of men's ages under 16, shew the proportion of the probability of such persons reaching the age of 70. See the article **LIFE**.

Thus it is four times more likely, that one of 16 years of age lives to be 70, than a child of one year old; it is thrice as probable that one of 9 years lives to be 70, as such a new-born child, &c. That the odds is 5 to 4, that one of 25 dies before one of 16; and so on, as the square roots of the ages.

Dr. Hally has made a very exact estimate of the degrees of the mortality of mankind, from a curious table of the births and burials at the city of Breslau, the capital of Silesia, and an attempt to ascertain the price of annuities upon lives. See the article **MORTALITY**.

From the whole he makes the two following

lowing very good observations: 1. How unjustly we use to complain of the shortness of our lives; for that it appears that one half of those that are born, do not live above 17 years; and, 2. That the growth and increase of mankind is not so much stunted by any thing in the nature of the species, as it is from the curious difficulty most people make of venturing on the state of marriage; and, therefore, that celibacy ought to be every way discouraged by all wise governments; and those who have numerous families of children encouraged by good laws, such as the *jus trium liberorum*, &c. among the Romans.

POLITICS, the first part of oeconomy, consisting in the well governing and regulating the affairs of a state, for the maintenance of the public safety, order, tranquillity, and morals. See **POLITY**.

POLITIO, or **POLIZZI**, a town of Sicily, in the Val Demona, thirty miles east of Palermo.

POLITY, or **POLICY**, *πολιτεία*, denotes the peculiar form and constitution of the government of any state or nation; or, the laws, orders, and regulations relating thereto.

Polity differs only from politics, as the theory from the practice of any art. See the articles **LAW**, **GOVERNMENT**, &c.

Some divide polity into agoronomy, or the regulations relating to mercantile affairs; and astynomy, or those which concern the judiciary government of the citizens: some add other branches, *viz.* those relating to ecclesiastical and military affairs.

POLL, a word used in antient writings for the head: hence to poll, is either to vote or to enter down the names of those persons who give in their votes at an election.

POLL-MONEY, a capitation or tax imposed by the authority of parliament on the head or person either of all indifferently, or according to some known mark of distinction.

POLLACK, in ichthyology, the name of two different species of gadus; *viz.* the cole-fish or raw-pollack, and the whiting-pollack. See the articles **GADUS**, **COLE-FISH**, and **WHITING**.

POLLARD, among hunters, a stag which has cast his horns.

POLLARD, or **POLLENGER**, in agriculture, signifies a tree that has been frequently polled, or lopped.

POLLEX, in anatomy, denotes either the

thumb or great toe, according as either manus or pedis is added to it.

POLLICEPS, a shell-fish of the multivalve-kind, with a long, thin, and fleshy pedicle, smaller at the base, and largest at the top; on the summit of which stands the shelly covering of the body of the animal, which is called a triton: this covering is composed of a considerable number of shelly laminae, of different shapes and sizes; but altogether forming a triangular body, from the opening in the two sides of which the creature thrusts out its arms. See plate CCXLVI. ord. 3. which represents the bluish pollicept, with the pedicle longer than the body: its fleshy covering consists of an uncertain number of laminae, all of a pyramidal figure, and shut every exactly: the pedicle is of a brownish-colour, and the shelly part is a mixed bluish, grey and white.

POLLING, among gardeners, the operation of spreading the worm-casts all over the walks, by means of long ash-poles; which is said to be very beneficial to the grafts of the walks.

POLLUTION, in general, signifies defilement, or the rendering a person or place unclean or unholy. For the jewish pollutions, see the article **IMPURITY**.

The romanists hold a church to be polluted by the effusion of blood, or of seed therein; and require its being consecrated anew. And the Indians are so superstitious on this head, that they break all the vessels which those of another religion have drank out of, or even only touched; and drain all the water out of a pond, in which a stranger has bathed.

POLLUTION, in medicine, a disease which consists in an involuntary emission of the seed in time of sleep. This, in different persons, is very different in degree; some being affected with it only once in a week, a fortnight, three weeks, or a month, and others being subject to it almost every night. The persons most subject to it, are young men of a sanguineous temperament, who feed high and lead a sedentary life. When this happens to a person but once in a fortnight or a month, it is of no great consequence; but when it happens almost every night, it greatly injures the health; the patient looks pale and sickly: in some the eyes become weak and inflamed, and are sometimes affected with violent deflections, and are usually at last incircled with a livid appearance of the skin. This distemper is to be cured rather

rather by a change of life than by medicines. When it has taken its rise from high diet, and a sedentary life, a coarser food and the use of exercise, will generally cure it; but if any medicines are to be given, nitre alone will do more than almost all the rest. This may be taken in large doses, a scruple at a time, with very little liquid with it, and must be continued for some time at night going to rest. The root of the water-lily, is greatly recommended by some in this case; and by others, the seeds of the agnus-castus; but it is very doubtful whether they have either of them any effect. Persons subject to this disease, should never take any stimulating purges, and must avoid as much as possible, all violent passions of the mind: and though exercise is recommended in moderation, yet if this be too violent, it will rather increase the disorder, than contribute to its cure.

POLLUX, in astronomy, a fixed star of the second magnitude in the constellation gemini, or the twins.

The same name is also given to the hindermost twin, or posterior part of the same constellation.

POLOCZK, the capital of the palatinate of the same name, in the dutchy of Lithuania, in Poland: east long. 29° , north lat. $56^{\circ} 30'$.

POLVERINE, in commerce, the ashes of the herb kali, preserved for the use of making glass. See GLASS and KALI.

POLYACANTHA, in botany, the same with the carduus, or thistle. See the article CARDUUS.

POLYADELPHIA, in botany, a class of plants, the eighteenth in order, whose stamina are connected together at their bases into several serieses.

The plants of this class, are subdivided into orders according to the number of their stamina: thus the polyadelphia pentandria, contain five stamina; and the polyadelphia icosandria and polyandria, contain twenty or more stamina.

POLYANDRIA, in botany, a class of plants, the thirteenth in order, with hermaphrodite flowers, and a large number of stamina, or male parts in each; these always exceed the number of twelve, and grow on the receptacle of the future seeds. The genera of this class being numerous, are arranged under different orders; the first of which is called polyandria monogynia, as containing only

one style; the second, polyandria digynia, as having two styles; and so of the polyandria trigynia, tetragynia, pentagynia, &c. from their containing three, four, five, &c. styles.

POLYANTHEA, a collection of common places, in alphabetical order; for the use of orators, preachers, &c. See the article BOOK.

POLYANTHUS, in botany, a garden-flower of the primrose kind. The word is also used to denote any plant, which produces many flowers. See the article PRIMULA VERIS.

POLYCHREST, in pharmacy, a medicine that serves for many uses, or that cures many diseases.

Sal **POLYCHREST**, a compound salt made of equal parts of salt-petre and sulphur, laid on a red-hot crucible.

POLYCNUM, in botany, a genus of the triandria monogynia class of plants, the flower of which is composed of five petals, very like the leaves of the cup but shorter: the seed, which follows each flower, is single; and has scarce any covering, or at most only a very thin membrane.

POLYGALA, MILKWORT, in botany, a genus of the diadelphia decandria class of plants, with a papilionaceous flower: the fruit is a turbinato-cordated capsule. A decoction of this plant, leaves and root together, being drank by nurses, is said to increase their milk; whence the name.

POLYGAMIA, in botany, a class of plants, the twenty-third in order, the characters of which are, that they have flowers of different structure; some having male-flowers, others female ones, and others hermaphrodite.

Of this class there are two orders, or subdivisions; whereof the first comprehends such polygamious plants, as contain the different kinds of flowers, on different parts of the same plant; and hence called polygamia monoecia: such are the musa, veratrum, celtis, parietaria, &c. The second order consists of such polygamious plants, as have their different flowers, not on the same individual plant, but on different plants of the same species: such are the chamærops, fraxinus, rhodiola, &c.

POLYGAMY, a plurality of wives or husbands, in the possession of one man or woman, at the same time.

Many arguments have been offered to prove the unlawfulness of polygamy,

one of the principal of which is, that the males and females brought into the world, are nearly on a ballance; only abating for a small excess on the side of the males, to make up for the extraordinary expence thereof, in war and at sea: whence it evidently follows, that nature only intends one wife, or one husband, for the same person: since if they have more, some must go without any at all. Hence it is justly concluded, that the christian-law, which prohibits polygamy, is more agreeable to the law of nature than the mahometan, and we may add, than the jewish law, by which polygamy was tolerated. Yet Selden, in his *Uxor Ebraica*, says, that a plurality of wives was allowed of not only among the Hebrews, but among all other nations. The antient Romans, it is true, were more severe in their morals, and never practised it, though it was not forbidden among them; and Mark Anthony is mentioned as the first, who took the liberty of having two wives: but from that time, it became pretty frequent in the empire, till the reigns of Theodosius, Honorius, and Arcadius, who first prohibited it in the year 393, by an express law. After this, the emperor Valentinian by an edict, allowed all the subjects of the empire, the liberty of marrying several wives: and it does not appear from the history of those times, that the bishops made any opposition to this introduction of polygamy.

By the laws of England, polygamy is made felony, except in the case of absence beyond the seas for seven years; and where the absent person is living in England, Wales, or Scotland, and the other party has notice of it, such marrying is felony by the statute 1 Jac. I. c. 11.

POLYGLOTT, *πολυγλωττος*, among divines and critics, chiefly denotes a bible printed in several languages. In these editions of the holy scriptures, the text in each language is ranged in opposite columns. The first polyglott bible, was that of cardinal Ximenes printed in 1517, which contains the hebrew text, the chaldee paraphrase on the pentateuch, the greek version of the LXX. and the antient latin version. After this, there were many others, as the bible of Jostiniani, bishop of Nebio, in hebrew, chaldee, greek, latin, and arabic; the psalter by John Potken, in hebrew,

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greek, ethiopic, and latin; Plantin's polyglott bible, in hebrew, chaldee, greek, and latin, with the syriac version of the new testament; M. le Jay's bible in hebrew, samaritan, chaldee, greek, syriac, latin, and arabic; Walton's polyglott, which is a new edition of Le Jay's polyglott, more correct, extensive, and perfect, with several new oriental versions, and a large collection of various readings, &c.

POLYGON, in geometry, a figure with many sides, or whose perimeter consists of more than four sides at least: such are the pentagon, hexagon, heptagon, &c. See **PENTAGON**, **HEXAGON**, &c.

Every polygon may be divided into as many triangles, as it has sides: for if you assume a point, as *a*, *pl. CCVII. fig. 2. n° 1.* any where within the polygon, and from thence draw lines to every angle *a b*, *a c*, *a d*, &c. they shall make as many triangles as the figure has sides. Thus, if the polygon hath six sides (as in the figure above) the double of that is twelve, from whence take four, and there remains eight: I say that all the angles *b*, *c*, *d*, *e*, *f*, *g*, of that polygon, taken together, are equal to eight right angles. For the polygon, having six sides, is divided into six triangles; and the three angles of each by 1. 32 Eucl. are equal to two right ones; so that all the angles together make twelve right ones; but each of these triangles hath one angle in the point *a*, and by it they complete the space round the same point; and all the angles about a point are known to be equal to four right ones, wherefore those four taken from twelve, leave eight the sum of the right angles of the hexagon.

So it is plain the figure hath twice as many right angles, as it hath sides, except four. *Q. E. D.*

Every polygon circumscribed about a circle, is equal to a rectangled-triangle, one of whose legs shall be the radius of the circle, and the other the perimeter (or sum of all the sides) of the polygon. Hence every regular polygon is equal to a rectangled-triangle, one of whose legs is the perimeter of the polygon, and the other a perpendicular drawn from the center to one of the sides of the polygon. And every polygon circumscribed about a circle is bigger than it; and every polygon inscribed is less than the circle, as is manifest, because the thing containing

is always greater than the thing contained. The perimeter of every polygon circumscribed about a circle is greater than the circumference of that circle, and the perimeter of every polygon inscribed is less. Hence a circle is equal to a right-angled triangle, whose base is the circumference of the circle, and its height the radius of it.

For this triangle will be less than any polygon circumscribed, and greater than any inscribed; because the circumference of the circle, which is the base of the triangle, is greater than the compass of any inscribed, therefore it will be equal to the circle. For, if this triangle be greater than any thing that is less than the circle, and less than any thing that is greater than the circle, it follows that it must be equal to the circle. This is called the quadrature or squaring of the circle; that is, to find a right-lined figure equal to a circle, upon a supposition that the basis given is equal to the circumference of the circle: but actually to find a right line equal to the circumference of a circle is not yet discovered geometrically. See the article CIRCLE.

Problems concerning POLYGONS. 1. On a regular polygon to circumscribe a circle, or to circumscribe a regular polygon upon a circle: bisect two of the angles of the given polygon A and B (*ibid.* n° 2.) by the right lines A F, B F; and on the point F, where they meet, with the radius A F, describe a circle, which will circumscribe the polygon. Next to circumscribe a polygon, divide 360 by the number of sides required, to find $e F d$; which set off from the center F, and draw the line $d e$, on which construct the polygon as in the following problem. 2. On a given line to describe any given regular polygon: find the angle of the polygon in the table, and in E set off an angle equal thereto; then drawing $E A = E D$, through the points E, A, D, describe a circle, and in this applying the given right line as often as you can, the polygon will be described. 3. To find the sum of all the angles in any given regular polygon: multiply the number of sides by 180° ; from the product subtract 360° , and the remainder is the sum required: thus, in a pentagon, $180 \times 5 = 900$, and $900 - 360 = 540$ the sum of all the angles in a pentagon. 4. To find the area of a regular polygon: multiply one side of the polygon by half the number of sides; and then multiply

this product by a perpendicular, let fall from the center of the circumscribing circle, and the product will be the area required: thus, if A B (the side of a pentagon) $= 54 \times 2\frac{1}{2} = 135$, and 135×29 (the perpendicular) $= 3915 =$ the area required. 5. To find the area of an irregular polygon, let it be resolved into triangles, and the sum of the areas of these will be the area of the polygon. See TRIANGLE, INSCRIBED, &c.

POLYGON, in fortification, denotes the figure of a town, or other fortress. See the article FORTIFICATION.

The exterior or external polygon is bounded by lines drawn from the point of each bastion, to the points of the adjacent bastions. See BASTION.

And the interior polygon, is formed by lines joining the centers of the bastions.

Line of Polygons, on the french sectors, is a line containing the homologous sides of the first nine regular polygons inscribed in the same circle; that is, from an equilateral triangle, to a dodecagon.

POLYGONAL NUMBERS, are so called, because the units whereof they consist may be disposed in such a manner, as to represent several regular polygons. See the article NUMBER.

The side of a polygonal number is the number of terms of the arithmetical progression that compose it; and the number of angles is that which shews how many angles that figure has, whence the polygonal number takes its name.

To find a polygonal number, the side and number of its angles being given, the canon is this: the polygonal number is the semi-difference of the faciums of the square of the side into the number of angles diminished by two units, and of the side itself into the number of angles diminished by four units.

The sums of polygonal numbers collected in the same manner as the polygonal numbers themselves are, out of arithmetical progressions, are called pyramidal numbers.

POLYGONATUM, SOLOMON'S SEAL, in botany, is ranked by Linnæus among the convallaria. See CONVALLARIA.

The root of this plant is a famous vulnerary; for being applied in form of a poultice, it not only heals fresh wounds, but takes away the marks of bruises, &c.

POLYGONUM, BISTORT. See the article BISTORT.

POLYGYNIA, among botanists, denotes an order or subdivision of a class of plants;

plants; comprehending such plants of that class, as have a great number of pistils, or female organs of generation. See PISTIL and GENERATION.

POLYHEDRON, in geometry, denotes a body or solid comprehended under many sides, or planes. See SOLID.

A gnomonic polyhedron is a stone with several faces, whereon are described various kinds of dials. See DIAL.

POLYHEDRON, **POLYSCOPE**, in optics, is a multiplying glass or lens, consisting of several plane surfaces disposed into a convex form. See the article LENS.

The phænomena of the polyhedron are as follow: 1. If several rays, as E F, A B, C D (plate CCVII. fig. 3. n° 1.) fall parallel on the surface of a polyhedron, they will continue parallel after refraction.

If then the polyhedron be supposed regular, L H, H I, I M, will be as tangents, cutting the spherical convex lens in F, B, and D; consequently, rays falling on the points of contact intersect the axis. Wherefore, since the rest are parallel to these, they also will mutually intersect each other in G.

Hence, if the eye be placed where parallel rays decussate, rays of the same object will be propagated to it still parallel from the several sides of the glass. Wherefore, since the crystalline humour, by its convexity, unites parallel rays, the rays will be united in as many different points of the retina, *a, b, c*, as the glass has sides.

Consequently, the eye, through a polyhedron, sees the object repeated as many times as there are sides: and hence, since rays coming from remote objects are parallel, a remote object is seen as often repeated through a polyhedron, as that has sides. 2. If rays, A B, A C, A D, *ibid.* n° 2. proceeding from a radiant point A, fall on several sides of a regular polyhedron; after refraction they will decussate in G, and proceed on a little diverging.

Hence, if the eye be placed where the rays coming from the several planes decussate, the rays will be propagated to it from the several planes a little diverging, i. e. as if they proceeded from different points. But since the crystalline humour, by its convexity, collects rays from several points into the same point; the rays will be united in as many different points of the retina, *a, b, c*, as the glass has sides; consequently, the

eye, being placed in the focus G, will see even a near object repeated as often through the polyhedron, as that has sides. Thus may the images of objects be multiplied in a camera obscura, by placing a polyhedron at its aperture, and adding a convex lens at a due distance therefrom. And it really makes a very pleasant appearance, if a prism be applied so as the coloured rays of the sun refracted therefrom be received on the polyhedron: for by this means they will be thrown on a paper or wall near at hand in little lucid specks, much exceeding the brightness of any precious stone; and in the focus of the polyhedron, where the rays decussate (for in this experiment they are received on the convex side) will be a star of surprising lustre.

If images be painted in water-colours in the areolæ or little squares of a polyhedron, and the glass applied to the aperture of a camera obscura; the sun's rays, passing through it, will carry with them the images thereof, and project them on the opposite wall. This artifice bears a resemblance to that other, whereby an image on paper is projected on the camera, *viz.* by wetting the paper with oil, and straining it tight on a frame; then applying it to the aperture of the camera obscura, so as the rays of a candle may pass through it upon the polyhedron.

POLYHISTOR, a person of great and various erudition; whence

POLYMATHY, *πολυμαθια*, denotes the knowledge of many arts and sciences.

POLYMNIA, in botany, a genus of the syngenesia polygamia necessaria class of plants, the common calyx of which is a roundish perianthium, consisting of ten leaves; the compound flower is convex, with five female floscules in the radius; there is no pericarpium; the cup remains unchanged, the seed is single, oval, gibbous and naked.

POLYMYTHY, *πολυμυθια*, in poetry, a fault in an epic poem, when instead of a single mythos, or fable, there is a multiplicity of them.

POLYNOMIAL, or **MULTINOMIAL**, in algebra. See MULTINOMIAL.

POLYOPTRUM, in optics, a glass thro' which objects appear multiplied, but diminished.

POLYPE, or **POLYPEUS**, in zoology, a small fresh-water insect of a cylindric figure, but variable, with very long tentacula. There is scarce an animal in the world more difficult to describe than this sur-

prising insect; it varies its whole figure at pleasure, and is frequently found beset with young in such a manner, as to appear ramose and divaricated; these young ones adhering to it in such a manner as to appear parts of its body.

When simple and in a moderate state as to contraction or dilatation, it is oblong, slender, pellucid, and of a pale-reddish colour: its body is somewhat smaller towards the tail, by which it affixes itself to some solid body; and larger towards the other extremity, where it has a large opening, which is the mouth, around which are the tentacula, which are eight in number, and one usually extended to about half the length of its body. By means of its tentacula, or arms, as they are commonly called, expanded into a circle of more than half a foot diameter, the creature feels every thing that can serve it for food; and seizing the prey with one of them, calls in the assistance of the others, if necessary, to conduct it to its mouth.

The production of its young is different from the common course of nature in other animals; for the young one issues from the side of its parent in the form of a small pimple, which lengthening every hour, becomes, in about two days, a perfect animal, and drops from off its parent to shift for itself; but before it does this, it has often another growing from its side; and sometimes a third from it, even before the first is separated from its parent; and what is very extraordinary is, that there has never yet been discovered among them any distinction of sex, or appearance of copulation; every individual of the whole species being prolific, and that as much if kept separate, as if suffered to live among others: but what is even still more surprising, is the reproduction of its several parts when cut off; for when cut into a number of separate pieces, it becomes in a day or two so many distinct and separate animals; each piece having the property of producing a head and tail, and the other organs necessary for life, and all the animal functions. There are several other species of this animal, most of which are found in our ditches. See plate CCVII. fig. 4. where n^o 1. represents a cluster-polyne, extending itself; and n^o 2. is the same polyne after being looked in water, and the tentacula, or branches, laid straight.

Mr. Ellis endeavours to prove, that corallines, and other marine productions of the like kind, are only cases or coverings for marine polypes. See the article CORALLINE.

POLYPETALOUS, among botanists, an epithet applied to such flowers as consist of several petals, or flower-leaves. See the article FLOWER.

POLYPODIUM, **POLYPODY**, in botany, a genus of mosses, the fructifications of which are disposed in round spots on the under side of the disk of the leaf.

The polypodies are not branched, but consist of single leaves, divided almost to the middle rib into oblong jaggs, or segments. Both the root and leaves are used in medicine, being a gentle cathartic, and recommended in obstructions of the viscera.

POLYPREMUM, in botany, a genus of the tetrandria-monogynia class of plants, the calyx of which is a four-leaved, permanent, perianthium; the leaves are spear-shaped, keel-shaped, and coloured on the inside; the corolla consists of a single rotated petal, the fruit is an oval capsule, emarginated, compressed at the top, divided into two valves, and containing two cells, in which are a great many seeds.

POLYPUS, or **POLYPUS** of the heart, in medicine, a mass composed of various pellicles and fibres generated in the heart and large vessels.

Polypuses are generally found in acute as well as chronic diseases. Their principal seat is in the heart, pulmonary artery, and the aorta. They chiefly attack the sanguine constitutions, and such as have small vessels and soft fibres; those who are of a sedentary life, who drink little, or are free in the use of acid wines and spirituous liquors, or who eat great suppers.

The beginning of a polypus may be known by a compression of the breast, a fixed pain about the heart; and when it increases, there is a frequent palpitation of the heart, from very slight causes; the pulse is strangely unequal, and often intermits; on a violent motion of the body, or the patient's taking a medicine which disturbs the blood, or on the mind's being violently affected, there arises a shortness of breath, and an incredible anxiety of the heart. Lastly, there are frequent faintings, without any evident cause, or only from a certain position of the

the body; and if the blood is let fall into hot water, it will congeal like jelly, and cleave into white filaments.

A polypus frequently produces the most dreadful diseases, and even sudden death. In the cure, an exact regimen and diet must be made use of, with frequent exercise, and motions of the body. Etmüller says, that when it proceeds from the scurvy, or hyfteric affection, it is curable, and that the cure is to be attempted with chalybeate and coralline medicines, with cinnabar, volatiles, preparations of amber, and all antispasmodics.

POLYPUSES of the lungs, are viscous excretions of the small glands, formed in the deeper branches of the aspera arteria, and frequently mistaken for pieces of the blood-vessels or lungs.

POLYPUS of the nose, a fleshy excrescence, in the inside of the nostrils, which is of various sizes, and of different consistencies; sometimes these excrescences are soft, sometimes they are capable of elongation, and at other times they turn hard and rigid. In their beginning they are generally small, and advance gradually; some are concealed within the nose, and others hang out of that organ down to the lips, while others descend backwards through the apertures by which we draw the air through the nostrils, and not only occasion great difficulty in speaking and swallowing, but sometimes almost strangle the patient. They are generally attended with pain; but some, which are hard and livid, are extremely painful. They have generally but one root; but sometimes they have many.

Heister mentions a method of extirpating a polypus, by conveying a ligature round its basis, and tying it fast: but when the roots are inaccessible, he advises taking hold of it with a crooked forceps, and twisting it till the roots are broken. If the flux of blood is not considerable, the surgeon may suffer it to continue till it ceases of itself; but if it is profuse and dangerous, it is to be stopped with doffils dipt in stiptic liquors and powders, thrust up the nostrils. Mr. Le Dran cured a polypus of the nose, which he could not extract wholly, in the following manner: he introduced one end of a large seton put on the point of the fore-finger of the left-hand into the patient's mouth, till he brought it behind the velum pendulum; then sliding a pair of thin crooked forceps into the affected nostrils, caught hold of the se-

ton, after covering what was to be introduced into the nose with a suppurant medicine. While he drew the cord, he endeavoured to preserve the velum pendulum from being hurt, by introducing his fore-finger into the mouth, and supporting the cord upon it. He continued the suppurant till he was sensible by the patient's breathing freely through the nostril, that the remains of the polypus were destroyed, and then he injected desiccatives to cauterize the ulcer.

POLYPYRENEOUS, an appellation given to fruits, containing several kernels, or seeds.

POLYSCOPE, in optics, the same with polyhedron. See **POLYHEDRON**.

POLYSPASTON, in mechanics, a machine consisting of an assemblage of several pulleys; for the nature and force of which, see the article **PULLEY**.

POLYSPERMOUS, among botanists, such plants as have more seeds than four succeeding each flower, without any certain order.

POLYSYLLABLE, in grammar, a word consisting of more syllables than three; for when a word consists of one, two, or three syllables, it is called a monosyllable, dissyllable, and trisyllable.

POLYSYNDETON, in grammar and rhetoric, a figure whereby a redundancy of conjunctions, especially copulative ones, is used; an example of which we have in the following verse of Virgil.

Una eurusque notusque ruunt, creberque procellis africanus.

POLYTHEISM, in matters of religion, the doctrine or belief of a plurality of gods. See the article **GOD**.

POLYTRICHUM, in botany, a genus of mosses, consisting of stalks furnished with leaves, and producing separate pedicles supporting capsules; the pedicles always grow out of the extremities of the stalks; the calyptræ are hairy; and the leaves in some species are rigid, in others soft.

POMADA, the exercise of vaulting the wooden horse, by laying one hand over the pommel of the saddle.

POMATUM, an ointment made thus: Take of fresh hog's lard, three pounds; of the apples commonly called pome-waters, pared and sliced, one pound nine ounces; of the most fragrant rose-water, six ounces; of storrentine orrice-root, grossly powdered, six drams: let all these boil together in balneo mariæ, till the apples are dissolved; then strain without expression, and keep it for use.

Quincy

Quincy observes, that the apples are of no significancy, and that the common pomatum is only lard beat into cream with rose-water, and scented with oil of lemons, thyme, or the like. Pomatums are also occasionally perfumed with the odours of jessamines, oranges, jonquils, tuberoses, &c. They are principally used for pimples, and foulnesses of the skin.

POMEGRANATE, *malus punica*, in commerce, the fruit of a plant called by botanists punica. See **PUNICA**.

This fruit does not much differ in its medicinal virtues from quinces, and is much ordered in decoctions against gonorrhœas and fluxes, and often in astringent clysters; though it has but little share in the shop-compositions. The juice, which is reckoned much less astringent than the fruit, is prescribed in weaknesses of the stomach and bowels, and removes nauseas, vomitings, and fluxes. It is reckoned also a good cooler in some inflammatory fevers. Its use in the shops is chiefly in the syrup of mint.

Pomegranates on being imported, pay a duty of 7 s. 8 ⁴/₁₀₀ d. the thousand; and draw back, on exportation, 6 s. 9 d.

POMEIS, in heraldry, are green roundles, so called by the english heralds, who give distinct names to the different coloured roundles.

POMERANIA, a province of Upper Saxony, in the north of Germany; bounded by the Baltic-sea, on the north; by Poland, on the east; by another part of Poland and Brandenburg, on the south; and by the dutchy of Mecklenburg, on the west.

POMIFEROUS, in botany, an appellation given to apple-bearing trees. See the article **APPLE**.

POMME, or **POMMETTE**, in heraldry, is a cross with one or more balls or knobs at each of the ends.

POMMEL, or **PUMMEL**, in the manege, a piece of brass, or other matter, at the top and in the middle of the saddle-bow.

POMMEL is also a round ball of silver, steel, or the like, fixed at the end of the guard, or grasp of a sword, to serve, in some measure, as a counterpoise.

POMPHOLYX, in the materia medica, a semi-metallic recement, very nearly allied in its nature to tutty; being a kind of flowers of zinc or calamine, sublimed higher than tutty, and carrying less of any metalline particles with it.

It is a white, light, and friable substance,

found in thin cakes or crusts, adhering to the domes of furnaces, and covers of large crucibles, in which brass is made either from a mixture of copper and lapis calaminaris, or of copper and zinc: it is found concreted also on the iron-rods, with which the workmen stir the metal while melting.

The pompholyx, therefore, as it approaches to true flowers of zinc, or as it carries less of the copper in it, has all the desiccative and abstergent virtues of tutty, and is less acrimonious: it obtunds the sharpness of the humours in any part; it is better than tutty in collyriums and unguents for the eyes, and is excellent in cleansing and drying old ulcers: it has also been given in intermitting fevers; but as there are many better medicines for these cases, it might be more proper to use them.

POMUM, **APPLE**. See **APPLE**.

POMUM ADAMI, **ADAM'S APPLE**. See the article **ADAMI pomum**.

POND, or **FISH-POND**. See **FISH-POND**.

POND-WEED, *potamogeton*, in botany. See the article **POTAMOGETON**.

Water POND-WEED, a species of persicaria. See the article **PERSICARIA**.

PONDESTURA, a town of Montferrat, in Italy, thirty-three miles east of Turin.

PONDICHERRY, a town of India, on the Coromandel-coast, sixty miles south of Fort St. George: here the French have a factory, and a strong fort to defend it.

PONE, in law, a writ whereby a cause depending in an inferior court, is removed into the king's bench, or common-pleas.

PONFERRADA, a city of Spain, thirty-eight miles south-west of Leon.

PONIARD, a little pointed dagger, very sharp edged: it is now little used, except among assassins.

PONS VAROLI, in anatomy, the upper part of a duct in the third ventricle of the brain. See the article **BRAIN**.

St. PONS, a town of Languedoc, twenty miles north of Narbonne.

PONTAFELLA, a town of Italy, twenty-five miles north of Friuli.

PONTAGE, a contribution towards the maintenance of bridges.

PONT A MOUSON, a town of Lorraine, fifteen miles north of Nancy.

PONT DE L'ARCHE, a town of Normandy, ten miles south of Rouen.

PONT D'ESPRIT, a town of Languedoc, forty-three miles north of Arles.

PONTE-

PONTEDERIA, in botany, a genus of the hexandria-monogynia class of plants, the flower of which consists of a single bilabiated petal; and its fruit is a trilobular, carnosé capsule, of a triangular figure, containing a great many roundish seeds.

PONTEFRACT, a borough-town, eighteen miles south-west of York.

It sends two members to parliament.

PONTESTURA, a town of Montferrat, six miles west of Casal.

PONTIFEX, **PONTIF**, or **HIGH PRIEST**, a person who has the superintendence and direction of divine worship, as the offering of sacrifice and other religious solemnities. The Romans had a college of pontifs, and over these a sovereign pontif, or pontifex maximus, instituted by Numa, whose function it was to prescribe the ceremonies each god was to be worshipped withal, compose the rituals, direct the vestals, and for a good while to perform the business of augury, till, on some superstitious occasion, he was prohibited intermeddling therewith. The office of the college of pontifs was to assist the high priest in giving judgment in all causes relating to religion, inquiring into the lives and manners of the inferior priests, and punishing them if they saw occasion, &c. The Jews too had their pontifs; and among the romanists, the pope is still styled the sovereign pontif.

PONTIFICATE, is used for the state or dignity of a pontif, or high priest; but more particularly in modern writers, for the reign of a pope.

PONTON, or **PONTOON**, in war, denotes a little floating bridge made of boats and planks. The ponton is a machine consisting of two vessels, at a little distance, joined by beams, with planks laid across for the passage of the cavalry, the cannon, infantry, &c. over a river, or an arm of the sea, &c. The late invented ponton is of copper furnished with an anchor, &c. to fix it. To make a bridge, several of these are disposed two yards asunder, with beams across them; and over those are put boards or planks. They are also linked to each other and fastened on each side the river by a rope run through a ring in each of their heads, and fixed to a tree or stake on either shore: the whole makes one firm uniform bridge, over which a train of artillery may pass. See **BRIDGE**.

PONTUS, the antient name of the countries situated on the south side of the Euxine-sea, now a part of Asiatic Turkey.

PONT VOLANT, flying bridge. See the article **BRIDGE**.

POOL, is properly a reservoir of water supplied with springs, and discharging the overplus by sluices, defenders, weirs, and other causeways.

Mill-POOL, a stock of water by whose force, &c. the motion of a mill is effected. See the article **MILL**.

Whirl-POOL. See **WHIRL-POOL**.

POOL, in geography, a borough and port-town of Dorsetshire, situated on a bay of the english channel, twenty miles east of Dorchester: it sends two members to parliament.

POOLWAY, one of the Banda or nutmeg islands in the indian ocean: east long. 128°, south lat. 3° 30'.

POOP, *puppis*, the stern of a ship, or the highest, uppermost, and hinder part of the ship's hull. See the articles **STERN** and **SHIP**.

POOR, in law, an appellation given to all persons who are in so low and mean a condition, as that they either are, or may become a burden to a parish.

Hence under the term poor, may be included those who are so through impotency; as the aged, the blind, the lame, the fatherless and motherless, persons labouring under sickness, or who are idiots, lunatics, &c. for all whom the overseers of the poor are obliged to provide.

There is also another kind of poor, on account of casualties and misfortunes; as decayed house-keepers, and those who have been ruined either by fire, water, robbery, or losses in trade, &c. all of whom, being able, are to be set to work, and otherwise relieved by the parish; and it is the same with respect to poor persons overcharged with children, disabled labourers, &c. As for vagabonds, strumpets and other thriftless sorts of poor, they may and ought to be sent to houses of correction, and put to hard labour, whereby they may be maintained: yet if even these fall sick there, or their work is not sufficient to maintain them, in that case there must be an allowance by the overseers for their support.

Before the reign of queen Elizabeth, we had few or no laws for the relief of the poor of this kingdom; but then a statute was made enacting, that the church-

churchwardens of every parish, and two or more householders are to be nominated and appointed yearly in easter week by two justices of the peace, as overseers of the poor; which said overseers shall meet once a month at the parish church, there to consider of proper ways to relieve the poor, &c. And with the assent of the justices they may make a rate on every inhabitant of the parish, and occupier of lands, houses, tithes; as also personal estate, to raise a stock for employing of the poor, relieving the impotent, and others not able to work, the placing poor children out apprentices, and erecting cottages for poor persons, &c. The overseers are likewise to give a true account to two justices within four days after the end of the year, or forfeit twenty shillings, and where these officers are not appointed, the justices incur five pounds penalty. 43 Eliz. c. 2. By this statute the father or grandfather, and mother or grandmother, or even children of poor impotent persons, where they are of ability, are obliged to relieve such poor, according to such rates as justices of peace in their sessions shall appoint, under a penalty of twenty shillings a month for every failure therein. *Ibid.* It has been adjudged that a grandfather or father-in-law, that is married to the grandmother, or mother, is within this statute; and if the father of any children leaves the parish, and there is a grandfather to be found, in case he is able to do it, it is said he shall be chargeable with the keeping of the children, and not the parish where they are.

By a late act, the churchwardens and overseers of the poor, where a wife or child is left upon a parish, by persons who have estates or effects which might maintain them, on a warrant of two justices, may seize the goods and receive the rents of the husband or father, in order to support such wife or child. 5 Geo. 1. c. 8.

Every parish is generally to keep and maintain its own poor; and in case any poor persons demand relief, that are not parishioners, they ought to be removed to their proper parishes, and there be relieved; for that parish the poor were last legally settled at, is deemed the place that shall provide for them. And where persons are removed, by warrant or order of justices of peace, they shall be received by the churchwardens and over-

seers whither sent, on pain of forfeiting five pounds to the poor of the parish whence conveyed, to be levied by distress and sale of goods, &c. Nevertheless a sick person should not be sent out of the parish where he is, so as farther to indanger his health; in which case, if the justices grant a warrant to remove him, it will be a misdemeanor in such justices.

As to the settlement, which entitles poor persons to relief, it is acquired several ways, *viz.* on account of birth, in the case of bastards, vagrants, &c. by continuance of forty days in a parish, after public notice given to overseers, &c. or coming into a parish and renting ten pounds a year estate, or executing any public annual office, paying a share to the parish taxes, &c. Also servants acquire this title, by serving a year in any parish; and persons bound apprentices; and tho' a person be only a lodger, it is held that his servant may gain a settlement by serving a year in any parish.

The wife of a person is to be sent to, and settled with her husband, even tho' he should be only a servant; and as generally all children are to their parents. It is however provided, that poor persons shall have the liberty to go to any parish, by virtue of a certificate from churchwardens and overseers, attested by two witnesses, and subscribed by two justices of peace, owning them to be parishioners; and likewise agreeing, when they become chargeable, to receive them again.

It is also ordained, that there shall be kept in every parish a book, wherein the names of all such persons, as receive any relief, shall be registered, with the occasion thereof; and the parishioners are once a year, or oftener, to have a meeting for that purpose, when the said list shall be examined into, by calling over the persons, and inquiring into the reasons why they are relieved; and at this time a new list must be made of those thought fit to be allowed to receive collection; and the persons thus receiving relief, ought to wear badges on their right shoulders, also no others shall have any benefit, unless by order under the hand of one justice, &c. 3 & 4 W. & M. c. 11. And no justice of peace shall make any such order in behalf of any poor person, till oath is made of reasonable cause for it, and that he was refused

to be relieved by the overseers, &c. And such person shall be registered in the parish books as other poor; nor may churchwardens and overseers bring to the parish account any money given to poor persons (except on sudden and emergent occasions) who are not registered, on pain of five pounds. The churchwardens and overseers of parishes are empowered to purchase or hire houses, and contract with persons, to maintain the poor, &c. who refusing to be so kept, shall be struck out of the parish books, &c. 9 Geo. 1. cap. 7. See 3 Geo. 2. c. 29.

For the manner of relieving poor prisoners, see the article PRISONER.

POOR, in ichthyology, a name given to the inch and a half gadus, with the anus in the middle of the body. See the article GADUS.

POPA MADRE, a town of Terra-Firma, in South America, situated on a high mountain, in west lon. 76°, north lat. 10° 15'.

POPAYAN, a province of South America, bounded by Terra-Firma, on the north; by New Granada, on the east; by Peru, on the south; and by the pacific ocean, on the west; situated between 75 and 80 degrees west longitude, and between the equator and 5 degrees of north latitude, being four hundred miles long, and about three hundred broad.

POPAYAN is also the capital of the province of Popayan, situated in west lon. 76°, north lat. 3°.

POPE, PAPA, the sovereign pontiff, or supreme head of the romish church. The appellation of pope was antiently given to all christian bishops, but about the latter end of the eleventh century, in the pontificate of Gregory VII. it was usurped by the bishop of Rome, whose peculiar title it has ever since continued. The spiritual monarchy of Rome sprung up soon after the declension of the roman empire. This sovereign is addressed under the term holiness; and in the council of the Lateran held under Innocent III. he was declared ordinary of ordinaries. The pope is an absolute monarch in his italian dominions, and his power is very considerable; being able, in case of necessity, to put fifty thousand men into the field, besides his naval strength in gallies. He is not only absolute in his own dominions, but issues his orders in ecclesiastical affairs, called briefs and bulls, throughout the catholic world. See the Vol. III.

articles CONSISTORY, BULL, and BRIEF.

The pope is chosen by the cardinals out of their own body. See the articles CARDINAL, and CONCLAVE.

POPE, POPA, in roman antiquities, the name of an inferior priest, or minister employed in the sacrifices, whose office, it is said, was to bring the victim to the altar, to tie it, and cut its throat. The popæ went half naked, the sleeves of their garment being tied up, and the skirts short and gathered about the waist; that they might not be incommoded in slaughtering the victim: while doing their office, they were always crowned with a laurel.

POPE'S TERRITORIES, in Italy, are bounded by the Venetian territories, on the north; by the gulph of Venice, on the north-east; by Naples, on the south-east; by the Tuscan sea, on the south-west; and by the dutchy of Tuscany, on the north-west, almost encompassing that dutchy on the land side; being about two hundred and twenty miles long, and from twenty to one hundred and forty in breadth.

POPE, in ornithology, a species of alca, with four furrows on the beak, and with the sides of the head white. See ALCA. This is a very singular bird, somewhat larger than the widgeon; the head is large, and rounded; the eyes are small; the beak short; the toes are three, placed forward, and connected by a firm membrane; and the wings are very short, and composed of but few feathers, and not intended for high flights.

POPERINGEN, a town of the Austrian Netherlands, in the province of Flanders, situated five miles west of Ypres.

POPLAR, in botany. See POPULUS.

POPLES, in anatomy, the inner part of the juncture, whereby the thigh-bone is articulated with the tibia.

POPLITÆUS, in anatomy, a small muscle obliquely pyramidal, situated under the ham. It is fixed above by a strong narrow tendon, to the outer edge of the condyle of the inner os femoris, and to the neighbouring posterior ligament of the joint; from thence it runs obliquely downwards, under the inner condyle of the os femoris; its flat and pretty thick fleshy body increasing gradually in breadth, till it is fixed in the backside of the head of the tibia, all the way to the oblique line observable on that side.

POPLITEA, in anatomy, a name given to the third vein of the leg, arising from
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the heel, where it is formed out of several branches, coming both from the heel and ankle. It lies pretty deep in the flesh, and ascending up to the ham, terminates in the crural vein.

POPO, a territory of Guinea, in Africa, lying west of Whidah.

POPPY, *papaver*, in botany, a genus of the polyandria monogynia class of plants, the corolla whereof consists of four roundish, plane, patent, large petals, narrowest at the base, and alternately smaller: the fruit is a capsule containing one cell, coronated with a large plane stigma, and opening with several foramina under it: the seeds are numerous and very small: the receptacles are longitudinal plicæ, of the same number with the rays of the stigmata; they grow to the sides of the fruit or capsule.

This is the plant which affords opium, for the virtues and preparations of which see the article *ORIUM*.

POPULAR, *popularis*, something that relates to the common people.

POPULEUM, in pharmacy, an unguent prepared of the buds of black poplar, violet-leaves, navel-wort, and lard bruised and macerated; to which are added bramble-tops, leaves of black poppies, mandragora, henbane, night-shade, lettuce and burdock boiled in rose-water and strained. It is much used as a cooler of burns, scalds, and all sorts of inflammations, also to assuage arthritic pains.

POPULUS, the poplar, in botany, a genus of the dioecia octandria class of plants, the corolla of which has no flower petals. The nectarium is monophyllous, turbinate, and tubulated below; oblique above, and terminating in an oval limb: the fruit is a roundish capsule, formed of two valves, and containing two cells, in each of which there is a number of roundish pappose seeds.

The buds of the poplar is used in the populeum, and the bark is detergent. The buds are also used by women in adorning and promoting the growth of their hair.

PORCAT, a port-town of hither India, situated on the coast of Malabar, in east long. 75° 30', north lat. 9°.

PORCELAIN, or PURCELAIN, a fine sort of earthen-ware, chiefly manufactured in China, and thence called china-ware. The most just idea we can form of the porcelain, or china-ware, is, that it is an half vitrified substance, or manu-

facture in a middle state between the common baked earthen-ware of our vulgar manufactures, and true glass. This is the essential and distinctive character of porcelain, and it is only by considering it in this light, that we are to hope of arriving at the perfect art of imitating it in Europe. This attempt is to be made on these principles in two different manners: the one by finding some appropriated matter, on which fire acts with more than ordinary strength, in the time of its passing from the common baked state of earthen-ware into that of glass. The other is to compose a paste of two substances, reduced to a powder, the one of which shall be of force to resist a very violent fire, so as not to become vitrified in it; and the other a matter very easily vitrifiable. In the first case, the matter is to be taken out of the fire at the time when it is imperfectly vitrified, and in the other, the compound mass is to remain in the furnace, till the one substance which is the more easily vitrifiable is truly vitrified; and being then taken out, the whole will be what porcelain is, a substance in part vitrified, but not wholly so. The first method is that by which the european porcelain has been generally made, which though it may be very beautiful, yet it is always easy to distinguish even the finest of it from the china-ware; and the nature of the two substances appears evidently different; these, owing all their beauty to their near approach to vitrification, are made to endure a long and violent fire, and are taken from it at a time when a little longer continuance should have made them perfect glass: on the contrary, the china-ware being made of a paste, part of which is made of a substance in itself scarce possible to be vitrified, bears the fire in a yet much more intense degree than ours, and is in no danger of running wholly into glass from it.

The two substances used by the Chinese, are well known by the names of petunse and kaolin; and on examining these, it appears very evident, that we have in Europe the very same substances, or at least substances of the very same nature, capable of being wrought into porcelain equally beautiful and fine. See the articles *KAOLIN* and *PETUNSE*.

In making the chinese porcelain, the first preparation of the petunse, is by breaking and reducing it into powder, rendered almost impalpable by mallets, mortars

tars and mills; which, being thrown into a large urn full of water, they stir briskly about with an iron instrument. After the water has rested a little while, they skim off from the top a white substance formed there, and dispose it in another vessel of water: they then stir again the water of the first urn, and again skim it, and thus alternately till there remains nothing but the gravel of the petunses at bottom, which they lay afresh into the mill for a new powder. As to the second urn, wherein are put the skimming of the first, when the water is well settled and become quite clear, they pour it off, and with the sediment collected at bottom in form of a paste, fill a kind of moulds, whence, when almost dry, they take it out, and cut it into square pieces, which are what they properly call square petunses; reserving them to be mixed with the kaolin in the proportion hereafter assigned. The preparation of the kaolin is the same with that of the petunses. Besides these two kinds of earths, there are as many kinds of oils, or varnishes, used in the composition of china-ware. The manner of preparing the first oil is this: the petunses being washed, undergo the same operation as for making the squares, excepting that the matter of the second urn is not put in moulds, but the finest part of it taken to compose the oil. To an hundred pounds of this matter they cast a mineral stone, called shekau; this stone is first heated red hot, and thus reduced in a mortar to an impalpable powder, and serves to give the oil a consistence, which however is still to be kept liquid. The oil of lime makes the fourth ingredient: the preparation whereof is more tedious and circumstantial. They first dissolve quicklime, and reduce it to a powder, by sprinkling water on it: on this powder they lay a couch of dry fern, and on the fern another of slacked lime, and thus alternately till they have got a moderate pile; which done, they set fire to the fern; the whole being consumed, they divide the ashes that remain on new couches of dry fern, setting them on fire as before; and this they repeat five or six times successively, or even more: the oil being still the better as the ashes are oftener burnt. A quantity of these ashes of fern and lime are now thrown into an urn full of water, and to an hundred pounds of ashes is added a pound of shekau, which dissolves therein. The rest

being performed after the same manner as in preparing the earth of the petunses; the sediment found at the bottom of the second urn, and which is to be kept liquid, is what they call the oil of lime, and which gives the porcelain all its lustre.

In forming vessels of PORCELAIN, the first thing is to purify the petunse and kaolin, which for the first, is done after the manner already described in preparing the squares; for the second it is sufficient to plunge it in an urn of water, in an open basket, as it will easily dissolve. The dregs that remain are perfectly useless, and are emptied out of the work-house when a quantity is got together.

To make a just mixture of petunse and kaolin, regard must be had to the fineness of the porcelain to be made: for the finer porcelain they use equal quantities; four parts of kaolin to six of petunse for moderate ones; and never less than one of kaolin to three of petunse for the coarsest. The hardest part of the work is the kneading and tewing the two earths together, which is done till the mass be well mixed, and grow hard, by the workmen trampling it continually with their feet. Then being taken out of the basons or pits wherein it is kneaded, it is done over a second time, but piecemeal, and with the hands, on large slates for that purpose; and on this preparation it is, that the perfection of the work depends: the least heterogeneous body remaining in the matter, or the least vacuity that may be found in it, being enough to spoil the whole. The porcelain is fashioned or formed either with the wheel like our earthen-ware, or in moulds. See the article POTTERY.

Smooth pieces as urns, cups, dishes, &c. are made with the wheel; the rest such as are in relievo; as figures of men, animals, &c. are formed in moulds, but finished with the chissel. The large pieces are made at two operations; one piece is raised with the wheel by three or four workmen, who hold it till it have acquired its proper figure; which done, they apply to it the other half, which has been formed in the same manner, uniting the two with porcelain earth made liquid by adding water to it; and polishing the juncture with a kind of iron-spatula. After the same manner it is that they join the several pieces of porcelain formed in moulds, or by the hand,

and that they add handles, &c. to the cups, and other works formed by the wheel.

The moulds are made after the same manner with those of our sculptors, *viz.* of divers pieces which severally give their respective figure to the several parts of the model to be represented, and which are afterwards united to form a mould for an intire figure. The earth they are made of is yellow, and fat. It is kneaded like potters-earth, and when sufficiently mellow, fine, and moderately dry, beating it stoutly, they form it into moulds, according to the works required, either by hand, or on the wheel. See MOULD.

All the works that are made in moulds are finished by the hands with several instruments proper to dig, smooth, polish, and to touch up the strokes that escape the mould, so that it is rather a work of sculpture than of pottery. There are some works whereon relievos are added, ready made, as dragons, flowers, &c. others that have an impression in creux, which last are engraved with a kind of puncheons. In general all porcelain-works are to be sheltered from the cold; their natural humidity making them liable to break when they dry unequally.

In the painting of PORCELAIN, it is observed, that the chinese painters, especially those that meddle with human figures, are all sorry workmen; but it is otherwise with the colours they use, which are so exceeding lively and brilliant, that there are little hopes our workmen will ever come to vie with them. The painting-work is distributed among a great number of workmen in the same laboratory; to one it belongs to form the coloured circle about the edges of the porcelain; another traces out flowers, which another paints; this is for waters and mountains alone; that for birds, and other animals; and a third for human figures.

There are porcelains made of all colours, both with regard to the grounds, and to the representations thereon. As to the colour of landscapes, &c. some are simple, such are all blues; others are mixed up with several tints; and others again are heightened with gold. The blue is made of lapis lazuli, prepared by burning it the space of twenty-four hours in a kiln, where it is buried up in gravel to the height of half a foot: when burnt, they reduce it into an impalpable powder in porcelain-mortars, not varnished, and with pestles of the same matter. For

the red they use copperas; a pound of this they put in a covered crucible, in the lid whereof is left a little aperture through which the matter on occasion may be seen. The crucible is heated with a reverberatory fire, till the black smoke ceases to ascend, and a fine one succeeds it. A pound of copperas yields four ounces of red matter, which is found at the bottom of the crucible; though the finest part is that usually adhering to the lid and sides of the crucible. The powder of flints is likewise an ingredient in most of the other colours, *e. g.* for green, to three ounces of scoria of beaten copper, they use half an ounce of powder of flint, and an ounce of ceruse. Violet is made by adding a dose of white to the green already prepared; the more green is added the deeper is the violet. For yellow they use seven drachms of white, and three of the copperas-red. Most of these colours are covered up with gum-water, for application, with little salt-petre; sometimes ceruse or copperas, but more usually copperas alone, being first dissolved in the water. Indeed for porcelains that are to be quite red, the colour is usually applied with oil, *i. e.* with the common oil of the porcelain; or another made of the white flints. There is another kind of red called blown red, because in reality applied by blowing with a pipe, one of whose orifices is covered with a very fine gauze: the bottom of this tube is lightly applied to the colour wherewith the gauze is smeared, when blowing against the porcelain it becomes all sprinkled over with little points. Black porcelain has likewise its beauty: this colour has a leady cast, and is usually heightened with gold. It is made of three ounces of lapis lazuli, with seven of the common oil of stone, though that proportion is varied as the colour is designed to be more or less deep. The black is not given to the porcelain till it be dry, nor must the work be put to the fire, till the colour be dry. The gold is not applied till after baking, and is rebaked in an oven for the purpose. To apply gold they break and dissolve it in water, at the bottom of a vessel of porcelain, till a thin gilded cloud arises on the surface; it is used with gum-water; and to give it a body they add three parts of ceruse or thirty of gold. There is likewise a kind of marbled porcelain, which is not made by applying the marblings with the

the pencil, but for oil to varnish it withal; using that of white flints, which hatches and cuts the work with a thousand humorous strokes, in manner of mosaic work. The colour this oil gives it is a white, somewhat ashy. There are several other kinds of porcelain, but they are such as are rather for curiosity than use.

The several kinds of porcelains being quite painted, with their several colours, and all the colours dry, are to be polished; to prepare them to receive the oil, or varnish, which is done with a pencil of very fine feathers, moistened with water, and passing lightly over to take off even the smallest inequalities. The oiling or varnishing is the last preparation of the porcelain, before it is carried to the oven: this is applied more or less thick, and seldomer or oftener repeated, according to the quality of the work: for thin fine porcelain, they give two very thin couches; to others one; but that one equivalent to the other two: there is a great deal of art in applying the varnish, both that it be done equally, and not in too great a quantity. The couches in the inside are given by aspersions, and those on the outside by immersion. It must be observed, that the foot is not yet formed, but continues in a mere mass, till the work has been varnished: it is at length finished on the wheel, and when hollowed, a little circle is pointed in it, and sometimes a chinese letter. This painting being dry, the foot is varnished, and the work now carried to the oven to be baked.

In the baking or nealing of PORCELAIN, there are two kinds of ovens used; large ones for works that are only brought to the fire once; and small ones for such as require a double baking: the large ones are two chinese fathoms deep, and almost four wide: they are formed of a mixture of three earths; the sides and roofs are very thick; at the top of the dome, which is in form of a tunnel, is a large aperture to give vent to the flames and smoke; besides which there are four or five small ones around, which, by being opened and shut, serve to augment and diminish the heat. The hearth, which takes up the whole breadth of the oven, is placed in front against the opening of the door, and is two or three feet deep, and two broad; people passing over it on a plank to go into the furnace to range the porcelain. As soon as

the fire is lighted, the door is walled up; only leaving an aperture for the conveyance of wood. Lastly, the bottom of the oven is covered with sand, wherein part of the first porcelain cases are buried. The oven itself is usually placed at the extremity of a long narrow vestibule, which serves instead of bellows; the air and wind being driven directly in the face of each oven.

Each piece of porcelain of any note, is disposed in the furnace in its peculiar separate case, but as to tea-dishes, &c. the same case serves for several. The cases are all of the same matter with the oven, they have no lids, but serve each other mutually; the bottom of a second case fitting into the aperture of the first, and thus successively to the top of each column. Each case, which is usually of a cylindrical form, that the fire may communicate itself more equably to the porcelains inclosed, has at bottom a little lay of fine sand covered over with dust of kaolin, that the sand may not stick to the work; and care is taken that the porcelain may not touch the sides of the case. In the larger cases, which hold the small pieces, they have the middle vacant, in regard porcelains placed there would want the necessary heat. Each of these little pieces is mounted on a small massive of earth, of the thickness of two crowns, covered with the powder of kaolin.

As fast as the cases are filled, a workman ranges them in the cavity of the furnace; forming them into piles, or columns, whereof those in the middle are at least seven foot high; the two cases at the bottom of each column are left empty, as in the uppermost, as the fire has the least effect on them. In this manner is the whole cavity of the oven filled with columns; excepting that part precisely under the grand aperture. In ranging the cases, they observe to place the finest piles of porcelain in the center; the coarsest at the bottom; and those that are high-coloured, and consist of as much petunse as kaolin, and wherein the worst oil is used, at the mouth. These piles are all placed very near one another, and are bound together at top, at bottom, and in the middle, by pieces of earth, in such a manner as that the flame may have a free passage among them, and insinuate equally on all sides. The oven must never be set altogether with new cases, but half one,

half

half the other, the old ones at the tops and bottoms of the pile, and the new ones in the middle. When the oven is filled, they wall up the door, only leaving a little aperture for the throwing in of little pieces of wood, to keep up the fire: it is then heated by degrees, for the space of a day and a night. To know when the porcelain is baked enough, they open one of the lesser holes of the oven, and with a pair of tongs take off the lid of one of the piles; if the fire appears very brisk and clean, and the piles equally inflamed, especially if the colours of the porcelains that are uncovered, dart forth a noble lustre, the coction is sufficient: they discontinue the fire, and wall up what remained of the door of the furnace. If the oven be only filled with small porcelain, they take them out twelve or fifteen hours after the fire is extinct; if it be filled with larger, they defer opening it for two or three days.

The Chinese make another kind of porcelain which they paint and bake twice; and for this second baking, they have a kind of little ovens on purpose. These ovens, when very small, are made of iron, or otherwise of a kind of bricks, made of the same earth with the porcelain cases: the largest of these ovens does not exceed five foot in height, and three in diameter; and being much in the form of bee-hives, the bricks are arched a little to form the cavity the better. The porcelains here are not inclosed in cases, as in the common ovens; the oven itself serving for that purpose, and being so exactly closed, that they receive no other impressions of the fire, but that of the heat of the charcoal, disposed in the hearth at the bottom of the oven, as well as at top of the vault; and in the interval between the oven and the shell, or brick-wall. To prepare the porcelain for a second baking, they must have had their varnish in the common manner, and have passed the great oven: in this state they are painted with various colours, after which, without giving them any new varnish, they are ranged in piles in the little oven, setting the little ones over the larger, in form of pyramids. This second baking is sometimes intended to preserve the lustre of the colours the better, and at the same time to give them a kind of relieve; but more usually its design is to hide defective places, by covering them over with co-

lours: tho' the artifice is easily found out by passing the hand over them. When the workman judges his porcelain enough baked, he takes off the piece that covers the aperture, and if the works appear glittering, and the colours glowing, he takes out the charcoal; and when the oven is cold, the porcelain is so too.

The Saxons have now carried this manufacture the greatest length of any other nation in Europe. Mr. Hanway tells us that, in order to preserve this art as much as possible a secret among themselves, the fabric at Meissen is rendered impenetrable to any but those who are immediately employed about the work; and that the secret of mixing and preparing the materials is known to a very few of them, who are all confined as prisoners, and subject to be arrested, if they go without the walls. It is with satisfaction, says that author, that I see the manufactories of Bow, Chelsea, and Stepney, have made such a considerable progress in this manufacture. The French court seems to have very much at heart, the promotion of the new manufacture of porcelain, lately set up in the royal castle of Vincennes, with a view of equalling that of Saxony.

China-ware, for every 100 l. gross value at the sale pays, on importation, 34 l.

19 s. 7 $\frac{56\frac{1}{4}}{100}$ d. and, on exportation, draws

back 32 l. 18 s. 7 $\frac{78}{100}$ d.

Glass PORCELAIN. See GLASS.

PORCELAIN SHELL, *porcellana*, in natural history, a genus of shell-fish, with a simple shell without any hinge, formed of one piece, and of a gibbose figure on the back: the mouth is long, narrow, and dentated on each side; and the animal inhabitant is a limax.

To this genus belong the argus-shell and map-shell, so called from their spots and variegations; as also a multitude of other very elegant species. See plate CCVIII. fig. 1. where n^o 1. represents the species, called the map-shell; n^o 2. the argus-shell; and n^o 3. two other species.

PORCH, in architecture, a kind of vestibule supported by columns; much used at the entrance of the antient temples, halls, churches, &c.

A porch, in the antient architecture, was a vestibule, or a disposition of insulated columns usually crowned with a pediment, forming a covert place before the principal door of a temple, or court of justice.

Such

Such is that before the door of St. Paul's Covent-Garden, the work of Inigo Jones. When a porch had four columns in front, it was called a tetrastyle; when six, hexastyle; when eight, octostyle, &c. See the article TETRASTYLE, &c.

PORCUPINE, *histris*, in zoology, a very singular genus of quadrupeds, belonging to the order of the glires. See the article QUADRUPEDS.

The fore-teeth of the porcupine are obliquely truncated, and it has no canine teeth: its ears are of a figure approaching to round, and the body is covered with prickles, or spines, and also with bristles, like those of a hog. The spines or quills, as they are commonly called, are of two kinds; some being shorter, thicker, stronger, and more sharp-pointed; and others longer, weaker, and more flexible: these last are a foot long, and compressed at the point. The spines of the first kind are white at the base, and of a dusky chesnut-colour on the upper part; and the latter kind are white at each extremity, and variegated with black and white in the middle. This terrible covering makes the creature appear much larger than it really is: it somewhat resembles the badger in shape; and its length, from the nose to the tail, is about two feet. See plate CCV. fig. 7.

The porcupine above described, is the common european kind, with four toes on the fore-feet, and five on the hinder. But besides this, there are several other species, distinguished by the number of their toes; as the american porcupine, with four toes on each of its feet; the east-india porcupine, with five toes on each of its feet, &c.

PORCUPINE-FISH, *histris*. See the article HISTRIX.

PORE, in anatomy, a little interstice, or space between the parts of the skin, serving for perspiration. See the articles CUTIS and PERSPIRATION.

The pores are most easily perceived in the hands and feet. In viewing the hand with a moderate glass, after its being well washed, we perceive innumerable little ridges of equal size and distance running parallel to each other, especially on the tips and joints of the fingers, where they are regularly disposed into spherical triangles and ellipses: on these ridges, the pores are placed in even rows, and by a good eye may be discerned without a glass; but with one,

every pore looks like a little fountain, in which the sweat may be seen to rise like clear rock-water. They are placed in the ridges, and not in the furrows between them, that they might be less able to be stopped by compression; and on this account, the pores of the hands and feet are larger than the rest.

PORELLA, in botany, a genus of mosses, the anthera of which is multilocular and foraminose. See the article MOSS.

PORIA, a genus of funguses, growing horizontally; but having its under side, not formed into lamellæ, but full of little holes or pores.

There are a great many species of poria, among which is the agaric of the shops. See AGARIC, and STYPTIC.

PORPESSE, in ichthyology, a species of the delphinus, with a coniform body, a broad back, and a subacute rostrum: it is a very large fish, frequently confounded with the dolphin, from which it is different. See DELPHINUS and DOLPHIN.

PORPHYROGENITUS, in antiquity, an appellation given to the children of the eastern emperors, as being descended of parents who wore purple.

PORPHYRY, in natural history, a kind of stone of a plain uniform mass, spotted with separate concretions, of great hardness, giving fire with steel, not fermenting with acids, and very slowly and difficultly calcining in a strong fire. See the article STONE.

Porphyry is of several sorts, as 1. The porphyry of the antients, which is a most elegant mass of an extremely firm and compact structure, remarkably heavy and of a fine strong purple, variegated more or less, with pale, red and white; its purple is of all degrees, from the claret-colour to that of the violet, and its variegations are rarely disposed in veins, but spots, sometimes very small, and at others, running into large blotches. It is less fine than many of the ordinary marbles, but it excels them all in hardness, and is capable of a most elegant polish. It is still found in immense strata in Egypt. 2. The hard red-lead-coloured porphyry, variegated with black, white and green. This is a most beautiful and valuable substance. It has the hardness, and all the other characters of the oriental porphyry, and even greatly excels it in brightness, and in the beauty and variegation of its colours. It is found in great plenty in the island of Minorca, and is extremely worth importing,

porting, for it is greatly superior to all the Italian marbles. 3. The hard, pale-red porphyry, variegated with black, white and green. This is of a pale flesh-colour; often approaching to white. It is variegated in blotches from half an inch to an inch broad. It takes a high polish, and emulates all the qualities of the oriental porphyry. It is found in immense strata in Arabia Petræa, and in the Upper Egypt; and in separate nodules in Germany, England and Ireland.

PORPHYRY-SHELL, a species of the purpura. See the article **PURPURA**.

PORRACEOUS, in medicine, a term applied to the bile, fæces, &c. when their colour approaches to that of a leek.

PORRUM, the **LEEK**, in botany, a species of allium, agreeing with the cepa, or onion, in medicinal virtues, being only accounted weaker. See the articles **ALLIUM** and **CEPA**.

PORT, a commodious place situated on the sea-coast, or at the mouth of a river, screened from the wind and the enterprises of an enemy, with depth of water sufficient for ships of burden, and where vessels lie by to load and unload.

Ports are either natural or artificial; the natural are those formed by providence, and the artificial such as are formed with moles running into the sea.

The city of Constantinople is called the **Port**, from its having one of the finest ports in Europe.

All the ports and havens in England are within the jurisdiction of the county; and the court of admiralty cannot hold jurisdiction of any thing done in them. 30 Hen. VI.

Bar-PORT, a port whose entrance is stopped up with a bar, or bank of sand, and can only be entered at high water, as that of Dublin.

Cinque PORTS. See **CINQUE PORTS**.

Close PORT, a port within the body of a city, as those of Venice, Rhodes, and Amsterdam.

Free-PORT, in commerce, a port in which merchants of all nations may load and unload their vessels, without paying any duties or customs; as those of Leghorn, Genoa, &c.

The same term is also used in a more limited sense for the same privilege granted to a set of merchants, with respect to the goods they import, and those exported by them that are of the growth of the country. Such was the privilege the English for several years enjoyed after

their discovery of the port of Archangel.

PORT is also used for the burden of a ship. See the article **BURDEN**.

The capacity of a vessel is estimated by tons, each of which may contain about two thousand pounds weight of seawater; but when it is said that a vessel is of the port, or burden, of five hundred tons, it is not meant that it bears five hundred tons weight of merchandize, but that the water which would be contained in the space which the capacity of the vessel possesses in the sea, would weigh five hundred tons.

PORTS, in a ship, the same with port-holes. See the article **PORT-HOLES**.

PORT, among sailors, denotes the larboard, or left side of the ship: thus to port a helm, is to put it on the left side of the ship, that the ship may go to the right.

PORT is also a strong wine brought from Port-a-port, also called Porto and Oporto. See the article **PORTO**.

PORT of the voice, in music, the faculty or habit of making the shakes, passages, and diminutions in which the beauty of a song or piece of music consists.

PORT-CRAYON, a pencil-case, which is usually four or five inches long, and contrived so as that the pencil may slide up and down. Its inside is round, and its outside is sometimes filed into eight sides or faces, on which are drawn the sector-lines: sometimes it is made round both withoutside and within, and has its length divided into inches and parts of inches.

PORT CULLICE, or **HERSE**. See the article **HERSE**.

PORT-DIEU, among the French, is a parish-priest; so called from his carrying the host to sick persons.

PORTEN-BESSIN, a port-town of Normandy, in France, situated on the English-Channel: west longitude 50', north latitude 49° 20'.

PORT-GLAIVE, **SWORD-BEARER**, an order of knights in Poland, confirmed by pope Innocent III. and sent by him into Livonia, to defend the preachers of the gospel against the infidels, at the first conversion of that country: but being too weak to accomplish it, they united with the teutonic knights, and assumed the title of knights of the cross.

PORT-GREVE, or **PORT-GRAVE**, was formerly the principal magistrate of maritime towns. The chief magistrate of London was antiently called by this name,

name, till Richard I. caused the city to be governed by two bailiffs, soon after which king John granted the city a mayor.

PORT-HOLES, in a ship, are the holes in the sides of the vessel, through which are put the muzzles of the great guns. These are shut up in storms to prevent the water from driving through them. The english, dutch, and french ships, have the valves, or casements, fastened at the top of the port-holes, and the spanish vessels aside of them.

PORT-LAST, the same with the gun-wale of a ship. See the article **GUN-WALE**.

The yard is down a-port-last, when it lies down on the deck.

PORT L'ORIENT, in geography, a fortress and port-town of Britany in France, at the mouth of the river Blavet: west long. $3^{\circ} 15'$, north lat. $47^{\circ} 42'$.

PORT-LOUIS, a port-town of Britany in France, situated in the bay of Biscay: west long. $3^{\circ} 6'$, north lat. $47^{\circ} 42'$.

PORT-MAHON, a port-town of the island of Minorca, situated on a fine bay at the east end of the island, in east long. $4^{\circ} 6'$, north. lat. $39^{\circ} 50'$.

PORT-MEN, a name given to the twelve burgesses of Ipswich.

PORT-MOTE, a court held in port-towns, as a swanimote in a forest.

Port-motes are also held in some inland towns, as at Knolst in Cheshire.

PORT-NAILS, such as are used to fasten the hinges to the ports of a ship.

PORT ROPES, in a ship. See the article **ROPE**.

PORT-ROYAL, the name of two monasteries of cistercian nuns, in the diocese of Paris; the one near Chevreuse, at the distance of five leagues from Paris, called Port-Royal of the Fields, and the other in Paris, in the Suburbs of St. James.

The nuns of the former of these monasteries, proving refractory, were dispersed, when many ecclesiastics, and others, who were of the same sentiments as these religious, retired to Port-Royal, took apartments there, and printed many books: hence the name of Port-Royalists was given to all of their party, and their books were called books of Port-Royal: from hence we say the writers of Port-Royal, Messieurs de Port-Royal, and the translations and grammars of Port-Royal.

PORT-ROYAL, in geography, a port-town,

situated in the extremity of a long point of land, in the south-east part of the island of Jamaica: west long. 77° , north lat. $17^{\circ} 30'$.

PORT-ROYAL, an island on the coast of South-Carolina, which, with the neighbouring continent, forms one of the most commodious harbours in the british plantations: west longitude 80° , north latitude $31^{\circ} 45'$.

PORT-ROYAL, in Acadia, the same with Annapolis. See **ANNAPOLIS**.

PORT ST. MARY'S, a port-town of Andalusia in Spain, ten miles north-east of Cadiz.

PORT-VENT, in an organ, is a wooden pipe which serves to convey the wind from the bellows to the sound-board. See the article **ORGAN**.

PORTA, or **VENA PORTA**, in anatomy, one of the three primary veins of the human body.

The vena-porta in its structure has some resemblance of a tree; the roots or inferior branches of which are divided into the right and left. From the right arise all the meseric veins of the intestines, the internal hæmorrhoidal, and the right epiploics: and from the left, which is called the splenic vein, arise the gastric veins, which are various; and form the coronary vein of the stomach; the vasa brevia, the epiploic, and the gastro-epiploic veins; the pancreatic, and sometimes also the internal hæmorrhoidal vein. The trunk of the vena-porta, which goes to the liver, affords the cystic veins, the right gastric, the duodenal, and this last often the pancreatic. In the branches, where the trunk begins to explicate, it constitutes the sinus-portæ in the liver; and from this it is divided into innumerable branches, which are dispersed through the whole substance of the liver.

PORTAIL, in architecture, the frontispiece of a church viewed on the side on which is the great door.

Portail is also used for the great door of a palace, castle, &c.

PORTAL, in architecture, a little gate where there are two gates of a different bigness; also a little square corner of a room cut off from the rest by the wainscot, and forming a short passage into the room. The same name is also sometimes given to a kind of arch of joiners work before a door.

PORTALEGRE, a city of Portugal, in

the province of Alentejo, eighty miles east of Lisbon.

PORTATE, or a **CROSS-PORTATE**, in heraldry, a cross which does not stand upright, as crosses generally do, but lies across the escutcheon in bend, as if it were carried on a man's shoulders. See plate CCV. fig. 4.

PORTENTRU, a city of Switzerland, in the bishopric of Basil: east longitude 7° , north latitude $47^{\circ} 30'$.

PORTER, in the circuit of justices, an officer who carries a white rod before the justice in eyre, so called a *portando virgam*.

Groom-PORTER. See **GROOM-PORTER**.

PORTER is also a kind of malt-liquor, which differs from ale and pale-beer in its being made with high-dried malt. See the articles **ALE** and **BEER**.

PORTERAGE, a duty paid at the custom-house to those who attend at the water-side, and belong to the package-office.

There are tables hung up ascertaining the portorage for landing and shipping goods.

PORTICO, in architecture, a kind of gallery on the ground, supported by columns, where people walk under covert. Though this word is derived from *porta*, a gate or door, yet it is used for any disposition of columns which form a gallery.

PORTIO, **PORTION**, a part or division of any thing. Thus *portio dura*, and *portio mollis*, in anatomy, is a portion of the seventh pair of nerves of the brain. See the articles **AUDITORY NERVES**.

PORTION, in law, a part, or proportion, either of money given with a daughter, or of an inheritance.

PORTION, in the canon-law, is that proportion or allowance which a vicar receives out of a rectory or impropriation.

PORTIONER, is where a parsonage is served by two or more clergymen alternately, in which case the ministers are called portioners, because they have only their proportion of the tithes or profits of the living.

PORTLAND, a peninsula in Dorsetshire, situated in the English channel, ten miles south of Dorchester, famous for producing the best free-stone.

PORTLAND STONE is a dull whitish species of psadurium, much used in buildings about London: it is composed of a coarse

spar: it will not strike fire with steel, but makes a violent effervescence with aqua-fortis. See **FREE-STONE**.

PORTMANTEAU, a cloak bag of cloth, leather, &c. in which the cloak, linen, and other habilaments of travellers are disposed and laid on the horse's crupper.

The same name is also given to a piece of joiner's work fastened to the wall in a wardrobe, armory, &c. proper for the hanging on of cloaks, hats, &c.

PORTMANTEAU, is also an officer under the king of France, of which there are twelve, whose business it is to keep the king's gloves, cane, sword, &c. to take them from him, and to bring them again when wanted. The dauphin has also his portmanteau, and the romish bishops their port-croix, port-mitres, &c. that is, their crozier-bearers, mitre-bearers, &c.

PORTO, or **OPORTO**, a city and port-town of Portugal, in the province of Entre-Minho-Douro: west longitude 9° , north latitude $41^{\circ} 10'$.

PORTO-BELLO, a port-town of America, situated on the narrowest part of the isthmus of Darien: west long. 82° , north lat. 10° .

PORTO-CAVALLO, or **PORTO-CABELO**, a port-town of Terra-Firma, in America, on the Caraccos-coast: west longitude $67^{\circ} 30'$, north latitude $10^{\circ} 30'$.

PORTO-FARINO, a port-town of Tunis, a little west of the ruins of Carthage: east longitude 9° , north latitude $36^{\circ} 30'$.

PORTO-FERAJO, a port-town on the north side of the isle of Elba, in the Tuscan-Sea: east long. $11^{\circ} 30'$, north lat. $42^{\circ} 35'$.

PORTO-GALLETO, a port-town of the province of Biscay, in Spain, eight miles north of Bilbao.

PORTO-HERCOLÉ, a port-town of Tuscany, situated on a bay of the Tuscan-Sea: east long. 12° , north lat. $42^{\circ} 20'$.

PORTO-LONGONE, a port-town on the east end of the isle of Elba, in the Tuscan-sea.

PORTO-RICO, an island in the american ocean, one hundred and twenty miles long, and sixty broad, which produces sugar, rum, and ginger: situated between 64° and 68° of west longitude, and in 8° of north lat. subject to Spain. The capital is also called Porto-Rico, and St John's city.

PORTO-SANTO, the least of the Madeira islands, eighteen miles in circumference: west



west longitude 16° , north latitude 33° .
PORTO-VECCHIO, a port-town of the island of Corsica, forty miles north of Sardinia.

PORTO-VENERO, a port-town of Italy, in the territory of Genoa, forty-five miles south east of Genoa.

PORTRAIT, **POURTRAIT**, or **POURTRAITURE**, in painting, the representation of a person, and especially of a face done from the life.

In this sense we use the term portrait-painting, in contradistinction to history-painting, where a resemblance of person is usually disregarded. Portraits, when as large as the life, are usually painted in oil-colours; sometimes they are painted in miniature with water-colours, crayons, pastils, &c.

PORTSMOUTH, a borough and port-town of Hampshire, situated on a fine bay of the English channel; it has one of the most secure, capacious, and best fortified harbours in England: west long. $1^{\circ} 6'$, north lat. $50^{\circ} 48'$.

This town sends two members to parliament.

PORTUGAL, the most westerly kingdom in Europe; it is about three hundred miles long, and one hundred broad, and is situated between 7° and 10° of west longitude, and between 37° and 42° of north latitude; being bounded by Spain on the north and east, and by the Atlantic ocean on the south and west. This country is neither so hot nor so fruitful as Spain; it however produces plenty of grapes, olives, oranges and lemons.

PORTUGALLICA TERRA, *earth of Portugal*, in the materia medica, the name of a fine astringent bole, dug in great plenty in the northern parts of Portugal, and esteemed a remedy against poisons and venomous bites, and good in malignant fevers. Whatever may be its virtues of this kind, however, it is manifestly an astringent of the very first class, and is used with great success in fluxes of all kinds. It is well known in some parts of the world, beside the kingdom where it is produced; but is not known in the english shops. The cheapness of our sophisticated bole-armenic, having excluded this whole valuable class of medicines from our practice. See the article **BOLE**.

The characters by which the portuguese earth is known from the other red boles, are these: it is of a close, compact, and

regular texture, considerably heavy, and of a fine florid red, of a smooth and shining surface, easily breaking between the fingers, and a little staining the hands. It adheres firmly to the tongue, melts freely and readily in the mouth, and has a strongly astringent taste, but leaves a little grittiness between the teeth. It does not ferment with acids, and suffers scarce any change of colour in the fire.

PORTULACA, **PURSLAIN**, in botany. See the article **PURSLAIN**.

PORUS, in general, denotes a pore. See the article **PORE**.

PORUS BILARIUS, according to some, is the same with the hepatic duct; but others make a distinction between them, and observe, that the ductus hepaticus runs from the liver to the ductus cholecocus; and that the branches of this distributed through the whole liver, make what are called the pori bilarii.

PORUS, in natural history, a name given by authors to a peculiar kind of fossil coral, of which there are many different species; these are all of a beautifully laminated structure, and seem allied to the mycetizæ or fungitæ; they are seldom found loose, but usually bedded in hard marble, and with their pores filled up with sparry or mineral matter. See the article **CORAL**.

POSE, in heraldry, denotes a lion, horse, or other beast standing still, with all his four feet on the ground.

POSEGA, the capital of Slavonia, situated on the river Orana: east long. $18^{\circ} 42'$, north lat. $45^{\circ} 35'$.

POSEN, or **BÖLZANO**, a town of Germany, in the circle of Austria, and bishopric of Trent: east long. $11^{\circ} 20'$, north lat. $46^{\circ} 30'$.

POSIDIUM, *ποσειδειον*, in ancient chronology, the seventh month of the athenian year; which consisted of thirty days, answered to the latter part of December and beginning of January, and had its name from a festival in honour of Neptune Posidonius kept in it.

POSITION, or **SITUATION**, in physics, an affection of place, which expresses the manner of any body's being therein. See the articles **BODY** and **PLACE**.

POSITION, in architecture, denotes the situation of a building with regard to the points of the horizon. Vitruvius directs the position of a building to be such, as that the four corners point directly to the four cardinal winds.

Circles of POSITION. See CIRCLE.

POSITION, in dancing, the manner of disposing the feet, with regard to each other. There are four regular positions: the first is when the feet are joined in a line parallel to the shoulders; the second, when the heels are perpendicularly under the shoulders, and of consequence the width of the shoulders apart; the third is when one foot is before the other, in such a manner as that the heel is in the cavity formed by the rotula and carpus of the foot; the fourth, when one foot is the width of the shoulders apart from the other, the heel still answering to the cavity above-mentioned, which is the only regular manner of walking.

POSITION, or the *rule of false POSITION*, otherwise called the *rule of FALSHOOD*, in arithmetic, is a rule so called, because in calculating on several false numbers taken at random, as if they were the true ones, and from the differences found therein, the number sought is determined. This rule is either single or double. Single position, is when there happens in the proposition some partition of numbers into parts proportional, in which case the question may be resolved at one operation, by this rule. Imagine a number at pleasure, and work therewith according to the tenor of the question, as if it were the true number: and what proportion there is between the false conclusion and the false proportion, such proportion the given number has to the number sought. See PROPORTION.

Therefore the number found by argumentation, shall be the first term of the rule of three; the second number supposed, the second term; and the given number, the third. See RULE of Three. Or the result is to be regulated by this proportion, *viz.* As the total arising from the error to the true total, so is the supposed part to the true one. Example, A, B and C designing to buy a quantity of lead to the value of 140 l. agree that B shall pay as much again as A, and C as much again as B; what then must each pay?

Now suppose A to pay 10 l. then B must pay 20 l. and C 40 l. the total of which is 70 l. but should be 140 l. Therefore, If 70 l. should be 140 l. what should 10 l. be?

Answer, 20 l. for A's share, which doubled makes 40 l. for B's share, and that again doubled gives 80 l. for

C's share, the total of which is 140 l. Double position, is when there can be no partition in the numbers to make a proportion. In this case, therefore, you must make a supposition twice, proceeding therein according to the tenor of the question. If neither of the supposed numbers solve the proportion, observe the errors, and whether they be greater or less than the supposition requires, and mark the errors accordingly with the sign + and —. See CHARACTER.

Then multiply contrarywise the one position by the other error, and if the errors be both too great, or both too little, subtract the one product from the other, and divide the difference of the products by the difference of the errors. If the errors be unlike, as the one + and the other —, add the products, and divide the sum thereof by the sum of the errors added together: for the proportion of the errors is the same with the proportion of the excesses or defects of the numbers supposed to be the numbers sought: or the suppositions and their errors being placed as before, work by this proportion as a general rule, *viz.* as the difference of the errors if alike; or their sum, if unlike, to the difference of the suppositions, so either error to a fourth number, which accordingly added to or subtracted from the supposition against it, will answer the question.

POSITION, in geometry, is a term sometimes used in contradistinction to magnitude: thus a line is said to be given in position, *positione data*, when its situation, bearing, or direction, with regard to some other line is given: on the contrary, a line is given in magnitude, when its length is given, but not its situation.

POSITION is also used for a thesis or proposition maintained in the schools. See the article THESIS.

POSITIVE, a term of relation sometimes opposed to negative; hence a positive quantity, in algebra, is a real or affirmative quantity, or a quantity greater than nothing: thus called in opposition to a privative or negative quantity, which is less than nothing, and marked by the sign —. Positive quantities are designed by the character + prefixed or supposed to be prefixed to them. See NEGATIVE, QUANTITY, and CHARACTER.

POSITIVE is also used in opposition to relative or arbitrary: thus we say beauty

is no positive thing, but depends on the different tastes of people. See the article RELATIVE.

It is also used in opposition to natural: thus we say, a thing is of positive right, meaning that it is founded on a law which depends absolutely on the authority of him who made it. See the article NATURAL.

POSITIVE DEGREE, in grammar, is the adjective in its simple signification, without any comparison; or it is that termination of the adjective, which expresses itself simply, and absolutely, without comparing it with any other; thus, *durus*, hard, *mollis*, soft, &c. are in the positive degree: but *durior*, harder, and *mollior*, softer, &c. in the comparative degree; and *durissimus*, hardest, and *molliissimus*, softest, &c. in the superlative degree. See the articles COMPARATIVE and SUPERLATIVE.

POSITIVE, in music, denotes the little organ usually placed behind or at the feet of an organist, played with the same wind, and the same bellows, and consisting of the same number of pipes with the larger one, though those much smaller, and in a certain proportion: this is properly the choir-organ. See ORGAN.

POSSE COMITATUS, in law, signifies the power of the county, or the aid and assistance of all the knights, gentlemen, yeomen, labourers, servants, apprentices, &c. and all others within the county that are above the age of fifteen, except women, ecclesiastical persons, and such as are decrepit and infirm.

This posse comitatus is to be raised where a riot is committed, a possession kept upon a forcible entry, or any force of rescue used, contrary to the king's writ, or in opposition to the execution of justice; and it is the duty of all sheriffs to assist justices of the peace in the suppression of riots, &c. and to raise the posse comitatus, or to charge any number of men for that purpose.

POSSESSIO FRATRIS, in law, is where a man seised of lands in fee, having issue a son and a daughter by one wife, and a son by a second wife, dies; and the first son enters as heir to his father, and he also dies, without issue. In this case the daughter may enter, and shall have possession of the lands as heir to her brother. Yet if the eldest son happens to die, not having made an actual entry and seisin, the son by the second wife may enter as heir to his father, and

shall enjoy the estate, and not the sister. **POSSESSION**, in law, the holding or occupying of any thing, either de jure or de facto.

Possession de jure, is the title a man has to enjoy a thing, though it be usurped and in the actual possession of another; or where lands are descended to a person, and he has not yet entered into them: and possession de facto, or actual possession, is where there is an actual and effectual enjoyment of a thing. A long possession is much favoured by the law, as an argument of right, even though no deed can be shewn, and it is more regarded than an antient deed without possession. Thus annual possession gives a right to moveables; a triennial and peaceable possession of a benefice is sufficient to maintain it, provided it be founded on a plausible title; a possession of an estate for ten years by one present, and of twenty years by one absent, with a title, or of thirty years without any, gives a full right; but a centenary possession, which constitutes possession immemorial, is the best and most indisputable of all titles.

If he that is out of possession of land brings an action, he must prove an undeniable title to it; and when a person would recover any thing of another, it is not sufficient to destroy the title of the person in possession, without he can prove that his own right is better than his.

In order to make possession lawful upon an entry, the former possessor and his servants are to be removed from off the premises entered on: but a person by lease and release, is in possession without making any entry upon the lands. See ENTRY, DISSEISIN, INDUCTION, &c.

POSSESSIVE, in grammar, a term applied to pronouns which denote the enjoyment or possession of any thing, either in particular or in common: as *meus*, mine, and *tuus*, thine; *noſter*, ours, and *veſter*, yours. See the article PRONOUN.

POSSIBILITY, *possibilitas*, in law, is defined to be any thing that is altogether uncertain, or what may or may not be, and is taken to be either near or remote. A near possibility, is where an estate is limited to one after another's decease, whilst a remote possibility is something extraordinary that is never likely to come to pass.

The law does not regard a remote possibility, nor may any possibility, right, or choice in action, &c. be granted or assigned

assigned to a stranger; though where it is founded on a trust it differs from a mere possibility, and therefore it is said to be devised by will, but the other cannot be so.

POSSIBILITY also denotes a non-repugnance to existing, in any thing that does not any way exist. See the articles **POSSIBLE** and **IMPOSSIBLE**.

This non-repugnance to existing, is no other than the producibility of any thing; which consists in this, that there are sufficient causes actually existing, or at least possible, whereby the thing may be produced, or be brought to exist, principally as there is a God, or an almighty cause; so that possibility does not imply any thing in the thing possible; but is a mere extrinsic denomination, taken from the power of the cause, and principally of God. In effect, if any creatable thing had any intrinsic possibility, it would follow that such a thing must even exist without the cause; and yet we may allow an intrinsic possibility of a thing, if by possibility we do not understand its producibility, or its non-repugnance to exist, but only the non-repugnance of the attributes contained in its idea. But such possibility is merely logical.

POSSIBLE, *possibile*, is sometimes opposed to real existence, and understood of a thing which, though it does not actually exist, yet may exist; as a new star, another world, &c. which are particularly said to be physically possible. It is also opposed to impossible, in which sense it is applicable to any thing that does not contradict itself, or involve contradictory predicates, whether it actually exist or not, as a man, fire, &c. these are also said to be logically possible. See the article **IMPOSSIBLE**.

Possibles are reckoned to be threefold, *viz.* future, potential, and merely possible. Future possible, is that whose production is decreed and ascertained, *v. gr.* the futuration of all those events fixed by the immutable decree of the Almighty. Potential possible, is that which is contained, or lies hid, in its causes; as the tree in the seed, the fruit in the tree, &c. And mere possibility, is that which might exist, though it never shall.

Others distinguish possibles into metaphysical, physical, and ethical. Metaphysical possible, is that which may at least be brought to being by some supernatural and divine power, as the re-

surrection of the dead. Physical possible, is that which may be effected by a natural power, as to overturn the turkish empire: and ethical possible, is that which may be done by prudent persons, using all the proper means they have for the same.

POSSUM, or **OPOSSUM**, in ichthyology. See the article **OPOSSUM**.

POST, a courier or letter-carrier, or one who frequently changes horses, posted or placed on the road, for quicker dispatch. The word is also applied to the houses where such a person takes up and lays down his charge.

In England, posts were first established by act of parliament in the twelfth year of the reign of Charles II. which enabled the king to settle a post-office, and appoint a governor. The general post-office in Lombard-street, London, is now managed by two post-masters general, who have under them about forty other officers of their own appointing, as the receiver-general, accomptant-general, secretary, solicitor, resident and principal surveyor, comptroller, accomptant, clerk of the franks, six clerks of the several roads with their assistants, a window-man, and ten sorters for the inland office: besides which there are for the foreign office a receiver-general, an accomptant-general, a secretary, a comptroller, and alphabet-keeper, a solicitor, supervisor of the letter-carriers, six clerks, &c. and twenty-three letter-carriers.

On this grand office depend one hundred and eighty post-masters in England and Scotland, who keep regular offices for their several stages, and sub-post-masters in their branches; and such is the disposition of the stages, that there is no considerable market-town in England but has an easy and certain conveyance for letters to and from the said office in the due course of the mails every post.

For foreign intelligence in times of peace, Mondays and Thursdays are the post days to France, Spain and Italy: Tuesdays and Fridays for Holland, Germany, Denmark, and Sweden; on Mondays and Fridays the post also goes for Flanders, and from thence to Germany, Denmark, and Sweden; and on the last Thursday of every month a packet-boat set outs from the Thames for Barbadoes, Montserrat, Nevis, St. Christopher's, Antego, and Jamaica. Letters are sent to all parts of England, Scotland, and Ireland, except Wales, on Tuesdays, Thurs-

Thursdays, and Saturdays, and are returned from all parts of England and Scotland every Monday, Wednesday, and Friday; from Wales, every Monday and Friday; and from Kent and the Downs, and a great many towns in other parts of England every day.

The charge of a letter of a sheet of paper eighty miles, is 3 d. of two sheets, 6 d. For above eighty miles, a sheet, 4 d. two, 8 d. An ounce of letters for eighty miles, 1 s. for above, 1 s. 6 d. &c. A single sheet from London to Edinburgh or Dublin, 6 d. &c.

The post travels at the rate of one hundred and twenty miles in twenty-four hours. And for those who choose to travel the post, horses are ready at the rate of 3 d. per mile, and 4 d. to the post-boy every stage.

The great mogul performs part of his postage by pigeons, kept in several places for the conveyance of letters upon extraordinary occasions, and these carry them from one end of that vast empire to the other. Tavernier observes, that at this day the consul of Alexandretta sends news daily to Aleppo, in five hours time by means of pigeons; though these places are distant three days journey on horseback.

Penny-Post, a post established for the benefit of London and the adjacent parts; by which any letter or parcel not exceeding sixteen ounces weight, or ten pounds value, is speedily conveyed to and from all parts within ten miles of London.

This office is managed by a comptroller; under whom are a collector, an accountant, six sorters, eight sub-sorters, and sixty-nine messengers.

Post, in the military art, is any place or spot of ground fortified or not, where a body of men may make a stand and fortify themselves, or remain in a condition to fight an enemy. Hence it is said, that the post was relieved, the post was taken sword in hand, &c.

Advanced Post, is a spot of ground seized by a party to secure the army, and cover the posts that are behind.

Posts, in building, large pieces of timber placed upright in houses. The posts framed into breffsummers for strengthening the carcase of a house, are called prick-posts, and the corner posts are called the principal posts.

Burning a little the ends of the posts that are to be set into the ground, is said to

be an excellent method to prevent them from rotting.

Posts, in sculpture, are ornaments formed after the manner of rolls or wreathings; some of which are simple, and others enriched, or flourished.

Post, AFTER, a latin preposition used in composition with several english words, and generally implying a relation of posteriority. Thus post-diem, in law, is used where any writ is returned by the sheriff after the day assigned; for which neglect the custos brevium has fourpence. Post disseisin, is a writ which lies for a person who has recovered lands, &c. by præcepe quod reddat, upon default or reddition, is again disseised by the former disseisor. Post-fine, is a certain duty payable to the king for a fine formerly acknowledged in his court; paid by the cognizee after the fine is fully passed, and all things touching the same are accomplished. Post-term, or post-terminum, is a return of a writ not only after the day assigned for its return, but also after the term; on which the custos brevium has a fee of 20 d. This word is also used for the fee so taken.

POSTDAM, or POTSDAM, a town of Germany, in the marquisate of Brandenburg, ten miles south-west of Berlin.

POSTEA, in law, is the return of a record of the proceedings in a cause after a trial and verdict by writ of nisi prius, into the court of common pleas, after a verdict; and there afterwards recorded.

POSTERIOR, a term of relation implying something behind, or that comes after another, in which sense it is used in opposition to prior and anterior.

POSTERIORITY, in law, coming after, a term used in opposition to priority; as where a person holds lands or tenements of two lords, he is said to hold of his antienter lord by priority, and of his latter lord by posteriority.

POSTERN, in fortification, is a small gate generally made in the angle of the flank of a bastion, or in that of the curtain, or near the orillon, descending into the ditch; by which the garrison may march in and out unperceived by the enemy, either to relieve the works, or to make private sallies, &c.

POSTHUMOUS, a child born after the death of his father, or taken out of the body of a dead mother, from whence it is frequently applied to the works of an author not published till after his decease.

Among

Among the Romans it was also used for a child born after the making of a will, which made it necessary for the testator to alter it.

POSTIL, a name antiently given to a note in the margin of the bible, and afterwards to one in any other book posterior to the text.

POSTING, among merchants, the putting an account forward from one book to another, particularly from the journal or waste-book to the ledger. See the article **BOOK**.

POSTIQUE, in architecture, an ornament of sculpture superadded after the work is done. A table of marble, or other matter, is also said to be postique, when it is incrustated in a decoration of architecture, &c.

POSTLIMINIUM, or **POSTLIMINY**, among the Romans, the return of one who had gone to sojourn elsewhere, or had been banished or taken by an enemy, to his own country and state.

POSTPONING, putting any thing after or behind another, with regard to time.

POSTSCRIPT, an article added to a letter or memoir, containing something learnt or recollected after the piece was written.

POSTULATE, *postulatum*, in mathematics, &c. is described to be such an easy, and self-evident supposition, as needs no explication or illustration to render it intelligible; as, that a right line may be drawn from one point to another. That a circle may be described on any center given, of any magnitude, &c. however, authors are not well agreed as to the signification of the term *postulatum*; some make the difference between axioms and postulata to be the same as that between theorems and problems; axioms, according to those authors, being indemonstrable theoretical truths. But others will have it, that axioms are primitive and common to all things, partaking of the nature of quantity, and which therefore may become the objects of mathematical science: such as number, time, extension, weight, motion, &c. and that postulata relate particularly to magnitudes, strictly so called, as to things having local extension, such as lines, surfaces, and solids; so that in this sense of the word *postulatum*, Euclid, besides axioms, or those principles which are common to all kinds of quantities, has assumed certain postulata to be granted him peculiar to extensive mag-

nitude. Hence several of the principles assumed in his elements, and ranked among the axioms by the moderns, are by Proclus ranked among the *postulata*, which has induced Dr. Wallis to judge, that the last of the two senses given to the term *postulatum* is most agreeable to the meaning of the antient geometers.

POSTULATION, *Postulatio*, in the canonlaw, the nomination of a parson to a dignity in the church, to which by the canons he cannot be elected, as for want of age, of birth, being already possessed of a benefice incompatible therewith, or the like impediment. Thus the formal election of such a parson being faulty, they are obliged to proceed by way of postulation, that is, the chapter beseeches the person to whom the confirmation of the election belongs to approve of it, though it be not canonical. See the article **ELECTION**.

POSTURE, in painting and sculpture, the situation of a figure with regard to the eye, and of the several principal members thereof with regard to one another, whereby its action is expressed. A considerable part of the art of a painter, consists in adjusting the postures, in giving the most agreeable postures to his figures, in accommodating them to the characters of the respective figures, and the part each has in the action, and in conducting and pursuing them throughout.

Postures are either natural or artificial. Natural postures are such as nature seems to have had a view to, in the mechanism of the body, or rather such as the ordinary actions and occasions of life lead us to exhibit while young, and the joints, muscles, ligaments, &c. are flexible. Artificial postures, are those which some extraordinary views, or studies, occasion us to learn: as those of dancing, fencing, &c.

POTABLE, *Potabilis*, something that may be swallowed by way of drink.

POTAMOGETON, **POND-WEED**, in botany, a genus of the tetrandria-tetragynia class of plants, the corolla whereof consists of four roundish, obtuse, hollow, patent, and unguiculated petals: there is no pericarpium, the seeds are four in number, roundish and acuminate, gibbous on one side, and compressed and angulated on the other. This plant has a refrigerating virtue, and is recommended in the cure of old ulcers.

POTANCE, in heraldry, a cross like that represented in plate CCV. fig. 5.

POT-

POT-ASH, the lixivious-ashes of certain vegetables, used in the making of glass, soap, &c. See **GLASS**, **SOAP**, &c.

The method of making pot-ash is directed by Dr. Shaw, as follows. Burn a quantity of billet-wood to grey ashes, and taking several pounds of these ashes, boil them in water, so as to make a very strong lixivium, or lye. Let this lye be strained through a coarse linen cloth, to keep out any black parts of the half-burnt wood, that might happen to remain in the ashes: then evaporate this strained lye in an iron-pan over a quick fire almost to driness: then taking out the matter remaining at the bottom, and putting it into an iron-crucible, set it in a strong fire till the matter is melted, and then immediately pour it out upon an iron-plate, where it soon cools, and appears in the form of a solid lump of pot-ash. Much after this manner, is pot-ash made in the large way of business, for the service of the soap-boiler, and glass-maker, fuller, &c. but according to the difference of the wood, or combustible matter employed, with the manner of turning it, and conducting the process, different kinds of pot-ash are prepared. There are certain saline-plants that yield this pot-ash to great advantage, as particularly the plant kali; there are others that afford it in less plenty, and of an inferior quality, as bean-stalks, &c. but in general, all vegetable subjects afford it of one kind or other, and may most of them be made to yield it tolerably perfect after the manner of the process already laid down, even the lopings, roots, and refuse parts of ordinary trees, vine clippings, &c. The fixed salts of all vegetables when reduced to absolute purity, or intirely separated from the other principles, appear to be one and the same thing: whence it should seem, says Dr. Shaw, that by a suitable management, good saleable pot-ash might be made in all places, where vegetable matters abound. For if by examining Russia pot-ash, for example, we find that its superior excellence depends upon its being clear of earth, or upon its containing a large proportion of oil, or fixed salt, these advantages may, by properly regulating the operation, be given to english pot-ashes, so as perhaps to render the latter as good as the former: but where the pot-ash of any remarkable saline vegetable is to be imitated, that of the kali, for example, the doctor recom-

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mends a prudent sprinkling of the subject with salt, or sea-water, in the burning; and by these ways properly diversified, any principle that is naturally wanting, might be artificially introduced so as to perfect the art of pot-ash.

Two other methods of making pot-ash have been published some years ago, in consequence of an encouragement granted by parliament for that purpose, one by Mr. Thomas Stephens, and the other ascribed to the late Sir Peter Warren.

Pot-ashes the barrel containing two hundred weight, pay on importation 12 s.

3 $\frac{7}{10}$ d. and draw back on exportation, 11 s. $\frac{62\frac{1}{2}}{100}$ d.

POTATOE, in botany, the english name for a species of the tuberoso-rooted solanum. See the article **SOLANUM**.

POTENT, or **POTENCE**, in heraldry, a term for a kind of a cross, whose ends all terminate like the head of a crutch. It is otherwise called the jerusalem cross, and is represented in plate CCV. fig. 6.

POTENTIA, **POWER**, that whereby a thing is capable either of acting, or being acted upon. See **POWER**.

POTENTIAL, in the schools, is used to denote and distinguish a kind of qualities, which are supposed to exist in the body in potentia only, by which they are capable in some manner of affecting and impressing on us the ideas of such qualities; though not actually inherent in themselves; in which sense we say, potential heat, potential cold. See the articles **HEAT** and **COLD**.

It is also used by schoolmen, for something that has the quality of the genus. A potential whole, is that which has its parts under it as a genus has its species, to distinguish it from an actual whole, which has its parts in itself, as a body composed of matter and form.

POTENTIAL, in medicine. Cauteries are distinguished into actual and potential. See the article **CAUTERY**.

POTENTIAL, in grammar, an epithet applied to one of the moods of verbs. The potential is the same in form with the subjunctive, and is according to Ruddiman implied in that mood, for which reason that grammarian rejects it: but others will have it to differ from the subjunctive in this, that it always implies in it either *possum*, *volo*, or *debeo*. It is sometimes called the permissive mood, because it often implies a permission or

concession to do a thing. See the articles MOOD, and SUBJUNCTIVE.

POTENTILLA, SILVER-WEED, WILD-TANSEY, or CINQUEFOIL, in botany, a genus of the icosandria-pentagynia class of plants, the corolla whereof consists of five roundish patent petals, inserted by their unguis into the calyx: there is no pericarpium, the receptacle of the seeds is roundish, small, and permanent, and is covered by the cup and surrounded with the seeds, which are numerous and acuminate.

This plant is said to possess in a great measure the virtues of the peruvian bark; whence the expressed juice of it is much recommended in intermitting fevers: a decoction of it is of great use in the fluor albus, and the seeds and root of it are said to cure a diarrhoea and hæmorrhage.

POTENZA, a city of Italy in the kingdom of Naples in the Basilicate, situated in east long. $16^{\circ} 40'$, north lat. $40^{\circ} 40'$.

POTERIUM, BURNET, in botany, a genus of the monoecia-polyandria class of plants, the corolla whereof is formed of a single petal, divided into four roundish concave patent segments, growing together at the base: the fruit is a berry, the outer crust of which is formed of the indurated tube of the corolla; the seeds are two.

POTHOS, in botany, a genus of the gynandria-polyandria class of plants, the spathe of which is globose: the corolla consists of four petals; and the fruit is a berry, containing several seeds.

POTION, *Potio*, a liquid medicine, consisting of as much as can be drank at one draught. The writers on pharmacy, distinguish potions into cathartic, cardiac, and alterative. See the articles CATHARTICS, &c.

POTOSI, a city of Peru in South America, situated at the bottom of a mountain of that name, in which is the richest silver-mine ever discovered; west long. 67° , south lat. 22° .

POTTERY, the manufacture of earthen ware, or the art of making earthen vessels.

The wheel and lathe are the chief, and almost the only instruments used in pottery: the first for large works, and the last for small. The potters-wheel consists principally in the nut, which is a beam or axis, whose foot or pivot plays perpendicularly on a free-stone sole or bottom. From the four corners of this

beam, which does not exceed two feet in height, arise four iron-bars, called the spokes of the wheel; which forming diagonal lines with the beam, descend, and are fastened at bottom to the edges of a strong wooden circle, four feet in diameter, perfectly like the felloes of a coach-wheel, except that it has neither axis nor radii, and is only joined to the beam, which serves it as an axis by the iron-bars. The top of the nut is flat, of a circular figure, and a foot in diameter: and on this is laid the clay which is to be turned and fashioned. The wheel, thus disposed, is encompassed with four sides of four different pieces of wood fastened on a wooden frame; the hind-piece, which is that on which the workman sits, is made a little inclining towards the wheel; on the fore-piece are placed the prepared earth; on the side-pieces he rests his feet, and these are made inclining, to give him more or less room. Having prepared the earth, the potter lays a round piece of it on the circular head of the nut, and sitting down turns the wheel with his feet till it has got the proper velocity; then, wetting his hands with water, he presses his fist or his fingers-ends into the middle of the lump, and thus forms the cavity of the vessel, continuing to widen it from the middle; and thus turning the inside into form with one hand, while he proportions the outside with the other, the wheel constantly turning all the while, and he wetting his hands from time to time. When the vessel is too thick, he uses a flat piece of iron, somewhat sharp on the edge, to pare off what is redundant; and when it is finished, it is taken off from the circular head, by a wire passed underneath the vessel.

The potters lathe is also a kind of wheel, but more simple and slight than the former; its three chief members are an iron-beam or axis three feet and a half high, and two feet and a half diameter, placed horizontally at the top of the beam, and serving to form the vessel upon; and another larger wooden wheel, all of a piece, three inches thick, and two or three feet broad, fastened to the same beam at the bottom, and parallel to the horizon. The beam or axis turns by a pivot at the bottom in an iron-stand. The workman gives the motion to the lathe with his feet, by pushing the great wheel alternately with each foot, still giving it a greater or lesser degree of motion,

tion, as his work requires. They work with the lathe, with the same instruments, and after the same manner as with the wheel. The mouldings are formed by holding a piece of wood or iron cut in the form of the moulding to the vessel, while the wheel is turning round; but the feet and handles are made by themselves and set on with the hand; and if there be any sculpture in the work, it is usually done in wooden moulds, and stuck on piece by piece on the outside of the vessel. For the glazing of the work, see GLAZING.

For the *chinese* POTTERY, see the article PORCELAIN.

POTTLE, an english measure containing two quarts. See MEASURE.

POTTON, a market-town, ten miles east of Bedford.

POULTICE, or POULTIS, a form of medicine also called a cataplasm. See the article CATAPLASM.

POULTRY, all kinds of domestic birds brought up in yards, as cocks, hens, capons, ducks, turkeys, &c. For the method of producing these from eggs, without the assistance of the parent-bird, see the article HATCHING.

POUNCE, gum sandaric pounded and sifted very fine, to rub on paper, in order to preserve it from sinking, and to make it more fit to write upon.

POUNCE is also a little heap of charcoal dust, inclosed in a piece of muslin or some other open stuff, to be passed over holes pricked in a work, in order to mark the lines or designs thereof on paper, silk, &c. placed underneath; which are to be afterwards finished with a pen and ink, a needle, or the like. This kind of pounce is much used by embroiderers, to transfer their patterns upon stuffs; by lace-makers, and sometimes also by engravers.

POUNCES, in falconry, the talons or claws of a bird of prey. See FALCONRY.

POUND, *libra*, a standing weight, for the proportion and subdivisions of which, see the article WEIGHT.

POUND also denotes a money of account; so called, because the antient pound of silver weighed a pound troy. See the article MONEY.

POUND, among lawyers, denotes a place of strength, in which to keep cattle that are distrained, or put in for trespass, until they are replevied or redeemed.

A pound overt, or open pound, is built on the lord's waste, and the owner of

the cattle may resort thither to give them meat; whereas a pound covert, or close pound, is one to which the owner cannot come to feed his cattle, without giving offence, as the distrainer's house, &c.

There is this difference between an open pound, and a close one; that no notice is necessary to be given to the owner to feed them, when confined in an open or common pound; but when the cattle are impounded in a close pound, the distrainer is to feed them at his peril.

A common pound is kept in every township, lordship, or village; and it is said, there ought to be the like in every parish, the want whereof is punishable in a court-leet.

Pound-breach is where a distress being impounded, the owner breaks the pound; in which case, whether the distress were just or not, the party distraining may have his action on the case by statute, and also retake the distress wherever he can find it.

POUNDAGE, a subsidy of 12 d. in the pound, granted to the crown on all goods and merchandizes exported or imported; and if by aliens, one penny more.

POUP, or POOP, in a ship. See the articles POOP and SHIP.

POURPRESTURE, in law, is a wrongful inclosure, or encroachment upon another person's property.

POURSELUC, a city of the kingdom of Siam: east long. 100°, north lat. 28°.

POURSUIVANT, or PURSUIVANT, in heraldry, the lowest order of officers at arms. See COLLEGE and HERALD.

The poursuivants are properly attendants on the heralds, when they marshal public ceremonies. Of these in England, there were formerly many; but at present are only four, *viz.* blue-mantle, rouge-cross, rouge-dragon, and portcullice. In Scotland, there is only one king at arms; who is stiled lion, and has no less than six heralds, and as many pursuivants, and a great many messengers at arms, under him.

POURTRAIT, or PORTRAIT. See the article PORTRAIT.

POURVEYANCE, or PURVEYANCE, in law, the providing corn, fuel, victuals, &c. for the king's household; and hence, the officer, who did so, was termed pourveyor.

As several offences were committed by these officers, it was enacted by stat. 12

Car. II. that no person under colour of purveyance, shall take any timber, cattle, corn, &c. from any subject without his free consent, or without a just appraisement, and paying for the same.

POUTING, a fish of the gadus-kind, with thirty rays in the fin beside the anus.

POWDER, *pulvis*, in pharmacy, a dry medicine well broken, either in a mortar, by grinding, or by chemical operations. See the articles PULVIS and PULVERIZATION.

The jesuits-powder is nothing but the quinquina, or peruvian bark reduced to powder. See QUINQUINA.

There are various other powders used in pharmacy, chemistry, &c. as algarot or emetic powder, cornachine powder, flux-powder, gun-powder, &c. See the articles ALGAROT, CORNACHINE, &c.

The powder of Haly, *pulvis Hali*, is a compound powder made of poppy-seeds, ten drams; of starch, gum arabic, and tragacanth, each three drams; of the seeds of purslain, marshmallows, and mallows, each four drams; of cucumber, melon, gourd, citrul, and quince-seed, cleansed, each seven drams; of liquorice, three drams; of white amber, two drams; and of sugar-candy, the weight of the whole: make them all into a powder.

As this powder is apt to grow rancid, if long kept, it is much better in the form of lozenges. See LOZENGE.

It is intended as an emollient, and to soften and heal internal injuries; as disorders of the breast, lungs and kidneys, spitting of blood, &c. It also cools the heat of urine in gonorrhoeas and strangueries; its dose being from half a dram to two drams.

A cephalic powder, as a sternutatory, may be made of the leaves of asarabacca, marjoram, and the lilies of the valley, each any quantity at pleasure.

The various kinds of powders mentioned in books of pharmacy, being endless, we shall only give the form of a powder against miscarriages: take red rose leaves, mastich, aloes-wood, pearls, red coral, of each a scruple; spikenard, mace, cinnamon, yellow saunders, cardamoms, and white amber, of each half a dram: reduce all to a powder. It is directed either in powder, from a scruple to a dram at a time, in red wine; or to be made into lozenges with their whole weight of sugar, and a mucilage of tragacanth.

The best powder for the hair is starch well pounded and sifted, and generally prepared with some perfume.

POWDERINGS, among builders, certain devices, serving to fill up vacant places in carved works.

POWER, *potentia*, in physiology, the faculty of doing or suffering any thing.

Power therefore is two-fold, *viz.* considered as able to make, or able to receive any change, the former whereof may be called active power, and the latter passive power. Of passive power, all sensible things abundantly furnish us with ideas, whose sensible qualities and beings we find to be in a continual flux, and therefore we look on them as liable to the same changes. Nor have we fewer instances of active power; since whatever change is observed, the mind must collect a power somewhere able to effect it; but, especially, by reflecting on the operations of our own minds, as the power of perception, of volition, &c. See the articles FREEDOM, WILL, PERCEPTION, &c.

Dr. Keil demonstrates that the physical power, or action of bodies, propagated in orbem: as light, heat, odour, &c. has its efficacy increased or diminished in a duplicate ratio of the distances from the center of radiation, or exertion of that power.

Thus, let A (plate CCX. fig. 1.) be a center from whence any power is exerted all round, according to the right lines A*e*, A*f*, A*g*, &c. the efficacy of this power will be at equal distances from A, as the spissitude or density of the rays A*b*, A*c*, A*d*, &c. But the rays within the inner circle, or rather spherical superficies, *bcdH*, when they come to be extended to the other spherical surfaces, *efgK*, will be much less close than before, *viz.* in the reciprocal proportion of the spaces they take up: and since spherical superficies are as the squares of their radii, therefore the efficacy of the power, in the inner surface, will be to that in the outer, as Ae^2 to Ab^2 . Q. E. D.

POWER, in mechanics, denotes any force, whether of a man, a horse, a spring, the wind, water, &c. which being applied to a machine, tends to produce motion. See the articles MACHINE and ENGINE. The intensity of a power is its absolute force; that is, its force, supposing its velocity equal to its weight: for its moving or acting force may be greater or less, according as its velocity is increased

or diminished, in respect of that of the weight. As for example, if a man be the power, and can raise from the ground a certain weight, that weight will express or be equal to the intensity of the power; for in this case, whatever engine be made use of, that part of the engine, where the weight is duly applied, will move just as fast as that on which a man acts with his whole force.

A power may act in any direction whatever; but a weight has only one direction, *viz.* towards the center of the earth. See GRAVITATION.

When we speak of the mechanical powers, the word power is taken in a very different sense from that above laid down; since, in this case, it signifies only an organ or instrument, whereby a power of a known intensity is made to act upon a weight: and therefore we must take care not to attribute any real force to any simple or compound machine, as many are apt to do merely because the name power has been given to mechanical organs, not from their effect, but from the effect which the power produces by their means.

For how much soever the force of a power is thereby increased, in order to sustain or raise a weight far superior to it in intensity; yet this cannot be done without losing in space and time what is gained in force; contrary to what some have vainly imagined, because the vulgar commonly speak of a machine as they do of an animal; attributing that effect to the machine, which is only the effect of the power by means of the machine: thus, it is usual to say, such a machine raises such a quantity of water, or performs such and such work; when we should say, if we would speak philosophically, such a running stream, such a fall of water, the wind, or so many men, horses, oxen, &c. raise so much water in such a time, &c. by means of such or such a machine. It were therefore to be wished, that the word power were to be confined to its proper sense, and not used to signify one of the mechanical organs; however, as it has been customary to use it in that sense, we have done so too, but withal thought proper to give the above caution.

The simple mechanical organs or powers are the lever, ballance, axis in peritrochio, pulley, screw, wedge, and inclined plane. See the articles LEVER, BALLANCE, &c.

POWER, in law, signifies in general, a

particular authority, granted by any person to another to represent him, or act in his stead. It is sometimes also used for a reservation in a conveyance, for the granter or grantee to do certain acts; as to make a jointure, to grant leases, &c. It is held, that the difference between a bare power and such as arises from an interest, consists in this, that a woman who has the former to sell lands, &c. may do it notwithstanding she marries; but where it is by reservation in a deed of settlement, she must execute it according to the power at the time it was first reserved.

For the power of the county, see the article POSSE COMITATUS.

In the feudal jurisprudence, the lord has a right to reunite to his fief, a dependent fee held of him, when the vassal has aliened the same; but then he must exercise this power within a year after he has notice of its fall, otherwise he loses it.

POWERS, POTENTIÆ, likewise denote the sixth order in the hierarchy of angels. See the article HIERARCHY.

POWERS, in arithmetic and algebra, are nothing but the products arising from the continual multiplication of a number, or quantity, into itself: thus, 2, 4, 8, 16, 32, &c. are the powers of the number 2; and a , a^2 , a^3 , a^4 , &c. the powers of the quantity a ; which operation is called involution. See the articles INVOLUTION and BINOMIAL.

Powers of the same quantity are multiplied by only adding their exponents, and making their sum the exponent of the product: thus, $a^4 \times a^5 = a^{4+5} = a^9$. Again, the rule for dividing powers of the same quantity, is to subtract the exponents, and make the difference the

exponent of the quotient: thus, $\frac{a^6}{a^4} =$

$a^{6-4} = a^2$. See the article EXPONENT.

Negative powers, as well as positive, are multiplied by adding, and divided by subtracting their exponents, as above.

And, in general, any positive power of a , multiplied by a negative power of a , of an equal exponent, gives unit for the product; for the positive and negative destroy each other, and the product is a^0 , which is equal to unit. Likewise,

$\frac{a^{-5}}{a^{-2}} = a^{-5+2} = a^{-3} = \frac{1}{a^3}$; and $\frac{a^{-2}}{a^{-5}} = a^{-2+5} = a^3 = \frac{1}{a^{-3}}$. And, in ge-

neral, any quantity placed in the deno-

mina-

minator of a fraction, may be transposed to the numerator, if the sign of its exponent be changed: thus, $\frac{1}{a^3} = a^{-3}$, and

$$\frac{1}{a^{-3}} = a^3.$$

The quantity a^m expresses any power of a , in general; the exponent m being undetermined: and a^{-m} expresses $\frac{1}{a^m}$, or

a negative power of a , of an equal exponent: and $a^m \times a^{-m} = a^{m-m} = a^0 = 1$. Again, a^n expresses any other power of a ; and $a^m \times a^n = a^{m+n}$, and $\frac{a^m}{a^n} = a^{m-n}$.

To raise any simple quantity to its second, third, or fourth power, is to add its exponent twice, thrice, or four times to itself; so that the second power of any quantity is had by doubling its exponent; and the third, by tripling its exponent; and, in general, the power expressed by m , of any quantity, is had by multiplying the exponent by m : thus the second power, or square of a , is $a^{2 \times 1} = a^2$; its third power, $a^{3 \times 1} = a^3$; and the m th power of a , is $a^{m \times 1} = a^m$. Also the square of a^4 , is $a^{2 \times 4} = a^8$; the cube of a^4 , is $a^{3 \times 4} = a^{12}$; and the m th power of a^4 , is $a^{4 \times m}$. The square of abc , is $a^2 b^2 c^2$; its cube $a^3 b^3 c^3$; and the m th power, $a^m b^m c^m$.

POWER of an hyperbola, in conics, is the sixteenth part of the square of the conjugate axis; or the fourth part of the square of the semi-conjugate axis. See the article HYPERBOLA.

POX, or SMALL POX, variolæ, in medicine, a contagious disease appearing on the surface of the skin, which it covers with pustules, or ulcerous eruptions, that frequently leave scars behind them.

The small pox is commonly divided into two kinds, the distinct and the confluent. The distinct or regular sort, according to Sydenham, begins with a shuddering and chillness, which is succeeded by an intense heat, violent pain of the head and back, vomiting, drowsiness, and sometimes epileptic fits, especially in children, which shew the pox to be ready to burst forth; and that they will be mild. The eruptions are usually on the fourth day from the beginning, at which time the

feverish symptoms either abate, or wholly disappear. The spots are at first reddish, and spread themselves over the neck, breast, and the whole body. On the eighth day the spaces between the pustules which were hitherto white, begin to grow red, and swell, the eye-lids are puffed up, and close the eyes; next to the face, the hands begin to swell; and the pustules of the face, before smooth and red, begin to be rough and whitish, and throw out a yellowish matter. On the eleventh day, the swelling of the face and inflammation disappear; and the pustules being ripe, grow dry and fall off: and on the fourteenth or fifteenth day, perish entirely. In the confluent sorts there are the same symptoms, but more violent; and as the disease increases, the eruptions do not arise to any considerable height: this sort is attended with spitting in adults, and generally with a looseness in children.

But though most authors, as we have already observed, divide the small pox into the distinct and confluent sorts; Dr. Mead thinks it more accurate, and agreeable to the nature of the disease, to divide it into simple and malignant. The simple sort is that in which the eruption is attended with a slight fever of short duration, the pustules fill kindly, make good matter in a few days, and at last fall off in dry scabs. The malignant sort is that in which the eruption is attended with a malignant fever, the pustules hardly come to any tolerable degree of maturity, and either suppurate not at all, or if they do in some measure, they are with difficulty brought to end in little crusts. The malignity appearing in various forms, has given various appellations to this disease, as the crystalline, the warty, and the bloody. The pustules of the crystalline sort, instead of a thick well-digested matter, contain nothing but a thin pale water, and are in some measure pellucid. And this sort is sometimes observed in the distinct as well as the confluent: sometimes this fluid flies off, and leaves hollow bladders. The warty pustules contain no fluid, but grow hard and prominent above the skin, like warts: these are peculiar to the distinct sort. The bloody pustules are produced more ways than one; for sometimes, at the very beginning of the disease, the pustules are small tubercles full of blackish blood, as if the skin was pinched with a forceps; then purple and livid spots follow, as in the true plague: but it more frequently happens,

pens, that the pustules coming out very thick, on the third or fourth day after, when they ought to fill, become livid and a little bloody, with black spots spread over the whole body, which forebode death in a day or two, these being real gangrenes. It very often falls out at this time, that a thin blood flows not only out of the patient's mouth, nose, and eyes, but also by every outlet of the body, but more especially by the urinary passages, as it does sometimes on the first days of the distemper: these are manifestly of the confluent kind.

In the management of the patient, in the distinct sort, it is a general rule, says Dr. Mead, to keep the patient in bed during the first days of the distemper, but neither to stifle him by heat and cloaths, nor to check the perspiration by cold; yet care ought to be taken to supply him with pure and cool air. With regard to diet, it ought to be very slender, moistening and cooling; such as oatmeal or barley gruel; and in the beginning, the best regimen is that which keeps the body open, and promotes urine: this end is obtained by boiling preserved fruit with their food, and giving them subacid liquors for drink, as small beer acidulated with orange or lemon juice, whey turned with apples boiled in milk, &c.

In the cure, Sydenham advises bleeding on any of the three first days, and then an ounce or an ounce and an half of emetic wine. Mead also, in the first place, advises bleeding even to children, and affirms that when they are seized with convulsions at the onset of the disease, some evacuation ought to be made, which may be safely done by leeches applied to the temples, or behind the ears, and that in most young subjects, if blood cannot be drawn from the arm, either of the jugulars may be opened. In youths and adults, he says, it is often necessary to take away blood two or three times, only with an intermission of two or three days between each time; for blood-letting is so far from being an obstacle to the eruption of the pustules, if the patient is not too weak, that it forwards it considerably. He adds, that after bleeding, a vomit should be given, if the stomach abound with phlegm or bile, or be loaded with food unseasonably taken: otherwise a purge may be prescribed before the eruption of the pustules, which may be the infusion of senna with manna, or manna alone, especially for children. To

keep the inflammation of the blood within due bounds, and to assist the expulsion of the morbid matter through the skin, take half an ounce of bezoardic powder, and two drams of purified nitre; mix these powders: half a dram of this mixture may be taken by an adult three or four times in a day; diminishing the quantity for children according to their age. Sometimes equal quantities of these ingredients may be prescribed; and if the effervescence of the fever runs very high, a proper quantity of the spirit of vitriol may be added to the patient's drink. When the eruption of the pustules is completed, an adult patient may take about fourteen drops of liquid laudanum, or an ounce of syrup of white poppies, in a little cowslip-flower-water, every night. But opiates are improper for children.

If this method is proper in the distinct small pox, it will be found more necessary in the confluent. In the crystalline sort, the water of the pustules can never be brought to a laudable suppuration; therefore, while the thinner parts are made to transpire through the skin, the grosser ought to be drawn off through the urinary passages. To this purpose nitre may be administered three or four times a day, from a scruple to half a dram, in small wine; and while nitre is thus taken, it will be proper to interpose medicines which cherish the heart, and promote the flux of the humours into the pustules, as the cordial confection, or the bezoardic powder, sometimes with a little saffron. Besides, on the fifth or sixth day, blisters are to be applied between the shoulders, and to the arms and legs; for which purpose the blistering epithem is most convenient. In the warty small pox, which is more dangerous than the crystalline, the utmost endeavours are to be used to take off the fever, and to provoke a sweat, in order to digest the morbid humour, by the cordial medicines above-mentioned; and, in this case, blisters are likewise to be applied. The bloody small pox requires peculiar attention; and Mead observes, that if there be any room for physic, those medicines bid fairest for success, which tend to thicken the blood: the best of this kind are the peruvian bark, alum, and oil of vitriol; which are best used alternately in this manner, a dram of the bark may be given every sixth hour, and three hours after a proper quantity of alum; which will be a powerful medicine, if thus compound-

ed,

ed, melt three parts of alum with one part of dragon's blood, over the fire; and when the mass is grown cold, reduce it to a powder: a scruple of this, made into a bolus with oil of roses, will be a proper dose. The most convenient manner of giving the oil of vitriol, is in the tincture of roses; of which tincture five or six spoonfuls may be taken four or five times a day. In every sort of this disease, it is proper to open the body on the decline, that is, on the ninth or tenth day from the eruption; because a putrid fever generally comes on about that time, while the pustules are drying; or upon the subsiding of the swelling of the inflamed skin, where there is no suppuration; gentle cathartics are the safest means of removing this fever, and such as were directed before the eruption: but if any purulent matter should still lurk under the withered skin of the pustules, the body is not yet to be purged, but rather to be supported by the proper diet, till the matter is all come away.

French Pox, lues venerea, is defined a malignant and putredinous dyscrasy of all the humours, but especially of the serum and lymph, arising from a venereal taint received into the body; or, according to Sydenham, when a gonorrhoea has continued a long while, or long enough for the poisonous matter to make its way into the blood; or by astringents given unseasonably, it cannot make its exit, then the patient is infected with the french pox. See the article GONORRHOEA.

The buboes in the groin constitute the first degree of this distemper: then follow pains of the head, joints, of the shoulders, arms, and ankles, coming on by fits, but at no certain intervals, unless in the night, when the patient is warm in bed. See the article BUBO.

There are also scabs and scurfs in various parts of the body, which are as yellow as a honeycomb; sometimes they have large surfaces, answering the description which authors give of the leprosy. All these symptoms gradually increase, especially the pain, which becomes so intense that the patient is unable to lie in bed. Afterwards, nodes or exostoses arise in the skull, shin-bones, and bones of the arms, which being attended with constant pain and inflammation, at length grow carious and putrefied. Phagedenic ulcers likewise seize various parts of the body, but generally first begin with the throat,

and from thence gradually creep by the palate to the cartilage of the nose, which they destroy, and the nose being destitute of its prop, falls down flat. The ulcers and pains daily increasing, the patient sinks under the torment, and one member rotting away after another, is hurried into his grave.

Besides these already mentioned by Sydenham, Astruc enumerates a large catalogue of symptoms that afflict the skin, the mouth, the throat, uvula, tonsils, the bones, the lymph, the lymphatic glands and vessels, the eyes, ears, &c. See the articles SERPIGO, HERPES, CARIES, APHTHÆ, EXOSTOSIS, GANGLION, &c.

Women afflicted with this distemper, have disorders proper to the sex, as cancers in the breast, a suppression or overflowing of the menses, the whites, the hysteric passion, an inflammation, abscess, schirrus, gangrene, ulcer, and cancer of the womb: they are either barren, or subject to abortion, or the children they bring into the world have an universal erysipelas, half rotten, and covered with ulcers. See the articles MENSES, WHITES, HYSTERIC PASSION, &c. The methods of curing the french pox are principally four: 1. The common one, by salivation. 2. By giving quicksilver-pills. 3. By mercurial frictions, which are to be purged off before a salivation is raised. And, 4. By sweating, with a decoction of guaiacum. For the first, of these methods, see SALIVATION. The second method of curing the french pox is by a quicksilver-pill. This was brought into reputation by Belloste; and, tho' he has kept the composition a secret, yet there is no reason to doubt but it is quicksilver mixed with a certain proportion of cathartic. Turner's imitation of this pill is as follows: take of quicksilver, two drams; turpentine, and pill of calocynth with aloes, of each half a dram; of which make twelve pills. The quicksilver must be well incorporated with the turpentine till it becomes invisible; and then the pill of calocynth with aloes is to be added: sometimes it will require a little crab's eyes, to give it a consistence. If one of these pills be taken night and morning, after the two first days, it will give two or three stools a day, without gripes or sickness. It may be proper, either night or morning, after the pill, to sweat the patient with a pint of the strong decoction

tion of guaiacum, drank hot upon it. In the middle species of this disease, the patient is directed to observe no particular regimen, but may go about his affairs as usual. This method of cure, as is allowed may be prescribed to very good purpose, in this stubborn disease; but it is not thought so effectual as salivation, without which, Turner is of opinion, that exostoses and carious tophti cannot be cured.

The third method of curing the french pox, is by mercurial frictions, which De-fault gives as follows: when the patient has a pox of a long continuance, and the venereal poison is dispersed all over the body, he should be prepared by bathing and drinking whey. But in a recent pox the bath is not necessary. After this, instead of raising a salivation, he brings on a flux of the belly, by means of clysters of a decoction of senna and the pulp of cassia, before the frictions are administered. When he finds that the looseness does not answer the number of frictions, nor the quantity of mercury made use of, he purges the patient with powder of jalap, and procures copious stools. While the looseness is going on, the friction does the office of a purge; and in proportion as they are repeated, the flux of the belly revives; and when it slackens or stops, he has recourse to the clysters and purges of jalap. He pursues this method till the symptoms cease, and till he is persuaded, by the abundance of the evacuations, the venereal poison is entirely drained off. By this means he carries off the pox and gonorrhœa at once. Dr. Douglas not only approved, but used this method with success. The frictions are to be made with mercurial ointment, and one third of quicksilver, from two or three drams to an ounce or an ounce and a half, every night or every other night.

The fourth and last method of curing this distemper, is with strong decoctions of guaiacum. This we have the first account of, from Sir Ulric Hutten, who pursued it himself. A pound of guaiacum is to be boiled in a gallon of spring-water, to one half, and the scum reserved to anoint the sores; and a second decoction is to be used for common drink. Boerhaave, who recommends this method, supposes that a salivation will be ineffectual, if every drop of fat in the blood is not melted down into water, and carried off; and the patient reduced to a

death-like paleness. He likewise supposes, that guaiacum performs its task by resolving all the unctuous particles, whether incorporated in the mass of blood, or accumulated in their proper repositories; and by emaciating the habit so exquisitely, as not to leave one drop of oil therein. He directs the patient to keep in a room of such a warmth, as that its mere heat will incline him to sweat; he advises also, through the whole course of the cure, to abstain from every thing that has the least oiliness in its nature, eating nothing but sea-biscuits and raisins, and drinking only a weaker decoction of guaiacum. He must also drink eight ounces every day of the strong decoction, the more the better, till some days his habit is bloated with it, as if he had the dropsy. After this let the patient every morning drink fasting as much of the decoction as his stomach will hold; and place himself in an erect posture in a sweating-box; or if he lies a-bed, let a stove be put under it. In either place he must receive on his naked body the steam of kindled spirits of wine, and there let him sweat as long and as plentiful as his strength will allow. After he has suffered this heat for half an hour, let the flame be extinguished and the patient sweat in his bed, about half an hour longer. After which let him take eight or ten ounces of veal-broth boiled in a small quantity of rice, but void of fat. His body must now be carefully wiped with warm dry flannel, after which let him rise and drink of his decoction, as formerly throughout the day. This must be done morning and evening in every article; for fourteen days successively; after this, in the morning fourteen days more.

PRACTICE, in arithmetic, or rules of practice, are certain compendious ways of working the rule of proportion, or golden-rule. See RULE of THREE.

Case I. When a question in the rule of three being duly stated, and the extremes are simple numbers of one name; whether the middle term be simple or mixt; if the extreme, which by the general rule is the divisor, be 1, and the middle term, an aliquot part, of some superior species; then divide the other extreme by the denominator of that aliquot part; the quote is the answer in that superior species; and if there is any remainder, it must be reduced, and its value found.

15 A

Example

Example 1. What is the price of 67 yards of cloth at 5s. per yard? The state of the proportion is, as 1 yd. : 5 s. :: 67; and because the divisor is 1 yd. and the middle term 5 s. which is a fourth part of one pound. Therefore divide 67 yds. by 4, the quote is 16 l. and 3 remains, which reduced to shillings, and divided by 4, quotes 15 s.

The reason of this practice is obvious; for if 1 yd. cost $\frac{1}{4}$ of 1 l. 67 yds. must cost $67 \frac{3}{4}$ parts, or, which is the same thing, the fourth part of 67 l.

Example 2. The value of 54 stone weight, at 10 s. ($= \frac{1}{2}$ of 1 l.) per stone, is 27 l. equal $\frac{1}{2}$ of 54.

Case II. If the price of an unit is an even number of shillings, multiply the other extreme (of the same name with the unit) by the half of that number; double the first figure of the product for shillings, and the remaining figures to the left, are pounds in the answer.

Example 1. What is the value of 324 yds. at 6 s. per yard?

Multiplying 324 by 3 (the $\frac{1}{2}$ of 6) the product is 972, which according to the rule, is 97 l. 4 s. which is the answer. And it is very easy to set down the shillings and pounds separately, without writing first down the total product, and then separating them.

The reason of this practice is, that if we multiply the whole even number of shillings, the product is the answer in shillings; which divided by 20, reduces it to pounds, the remainder being shillings: but if we multiply only the half of these shillings, the product is only the half of the value in shillings. Now suppose we multiply this product by 2, to give the whole number of shillings, and divide this last product by 20, to reduce them to pounds; then, because 20 is two times 10, it is plain that the product made by the half of the given price, being first multiplied by 2, and this product divided by 20 (or, which is the same thing, first by 2, and the quote by 10) the last quote will be the same as if that first product were only divided by 10; because to multiply by 2, and then divide the product by 2, brings back the same number that was multiplied: wherefore it is plain, that if the first product is divided by 10, the quote is the answer in pounds and tenth parts; and, because the divisor is 10, therefore the integral quote, or pounds, are

expressed by the dividend, excluding the first figure on the right hand; and because that figure is the number of tenth parts, therefore the double of it is the number of twentieth parts, that is, of shillings, and thus every part of the rule is clear.

Observe; if the price of one unit consists of pounds and shillings, whose half reduced to shillings is a number by which we can easily multiply, so as to bring out the product in one line at the first step, as we may if that half doth not exceed 20, then we also use the above method.

Example. What is the price of 467 yds. at 1 l. 14 s. per yard? Here 1 l. 14 s. is 34 s. whose half is 17, by which multiplying 467, according to the rule, the answer is 793 l. 18 s.

Case III. If the middle term is not an aliquot part of some superior integer, (the divisor being always 1) yet it may be equal to the sum of several aliquot parts; and then if you divide by the denominators of each of these separately, and add all the quotes, the same is the answer required.

Example. If 1 yd. cost 15 s. what cost 49 yards? Answer 36 l. 15 s. found thus; 15 s. is 10 s. and 5 s. viz. the $\frac{1}{2}$ and $\frac{1}{4}$ of 1 l. so I take the $\frac{1}{2}$ of 49 l. which is 24 l. 10 s. and $\frac{1}{4}$, which is 12 l. 5 s. whose sum is 36 l. 15 s.

The reason of this is plain, but it is to be observed, that in most cases where the middle term is not an aliquot part, the common rule by reduction is easier.

Case IV. If the middle term is so mixed as to have in it any number of the highest species, first multiply the number, and then the other parts by some of the former cases, if possible, and if this cannot be done, or not without much working; then the common method of reduction is to be taken.

Example 1. If 1 yd. cost 4 l. 6 s. 8 d. what cost 734 yards? Answer 3180 l. 15 s. 4 d. for 4 l. multiplied by 734, produces 2936 l. and for 6 s. 8 d. which is the $\frac{1}{3}$ of 1 l. you must take the $\frac{1}{3}$ of 734, which is 244 l. 13 s. 4 d. and the sum of both is 3180 l. 15 s. 4 d.

Example 2. Suppose the price of 1 yd. 3 l. 7 s. 9 d. then no method by aliquot parts is so easy as the common method by reduction.

Case V. If the extreme which is the multiplier is an aliquot part, or the sum of certain aliquot parts, of the unit which

which is divisor, then take by division such part or parts of the middle term, (whether this be a simple, or mixed number,) and if the multiplier has also some number of the same species with the unit, you must work for that number separately by some of the former cases, or the common rule; then add all the parts, which is the answer.

Example 1. If 1 pound weight cost 32 l. what cost 4 ounces? Answer 8 l. viz. $\frac{1}{4}$ of 32 l. because 4 ounces are $\frac{1}{4}$ of 1 lb.

Example 2. If 1 l. buy 3 hund. weight 1 qr. 7 lb. how much will 28 l. 5 s. 6 d. buy? Answer 93 ct. 2 qrs, 18 lb. $\frac{4}{10}$ oz. which is found thus; first for the 28 l. multiply 3 ct. by it, which gives 84 ct; then for 1 qr. take $\frac{1}{4}$ of 28, is 7 ct. and for 7 lb. take $\frac{1}{16}$ of 28, is 1 ct. 3 qrs. or, which is the same thing, take $\frac{1}{4}$ of 7 ct. because 7 lb. is $\frac{1}{4}$ of 1 qr. so the total for 28 l. is 92 ct. 3 qrs. for 5 s. which is $\frac{1}{4}$ of 1 l. take $\frac{1}{4}$ of 3 ct. 1 qr. 7 lb. it is 3 qr. 8 lb. 12 oz. and for 6 d. which is $\frac{1}{10}$ of 5 s. take $\frac{1}{10}$ of 3 qr. 8 lb. 12 oz. it is 9 lb. $\frac{4}{10}$ oz. so the total for 5 s. 6 d. is 3 qr. 18 lb. $\frac{4}{10}$ oz. and to this adding 92 ct. 3 qr. the sum is 93 ct. 2 qr. 18 lb. $\frac{4}{10}$ oz.

| l. | s. | d. | |
|----|----|----|--|
| | 4 | 6 | |
| 6 | 16 | | |
| | 17 | | |
| | 2 | 2 | |
| 7 | 15 | 3 | |

The product of

4 s. by 34
6 d. by 34
4 s. 6 d. by $\frac{1}{2}$

These are the chief and fundamental practices by aliquot parts, which who ever understands, will easily find many particular abridgments depending upon the same principles.

PRÆ, a latin preposition, literally signifying *before*, and used in many words in our language, to denote the relation of priority; though they are often written with a common *e* instead of the *æ*; as præcession or precession, prædecessor or predecessor, &c. See the articles PRECESSION, PREDECESSOR, &c.

PRAGMATIC SANCTION, in the civil law, is defined by Hottoman to be a rescript, or answer of the sovereign, delivered by advice of his council, to some college, order, or body of people, upon consulting him on some case of their community. The like answer given to any particular person, is called simply rescript. The term pragmatic sanction, is chiefly

| The work. | ct. | qr. | lb. | | ct. | qr. | lb. | oz. |
|-----------|-----|-----|-----|----|-----|-----|-----|-------------------|
| 3 | 1 | 7 | | 4 | 3 | 1 | 7 | 00 |
| 28 | | | | 10 | | | | |
| 84 | | | | | 3 | 8 | 12 | |
| 7 | | | | | | 9 | 04 | $\frac{4}{10}$ |
| 1 03 | | | | | 3 | 18 | 00 | $\frac{4}{10}$ |
| | | | | | 92 | 3 | 00 | 00 |
| Sum | 92 | 03 | | | 93 | 2 | 18 | 00 $\frac{4}{10}$ |

Note. If the multiplier and the middle term are both of the same kind of things, then we may consider either as the multiplier, as shall be most convenient for the operation.

Example. If 1 l. gain 4 s. 6 d. how much is thereby gained upon 34 l. 10 s? Answer 7 l. 15 s. 3 d.

Which is found two ways, viz. First multiply 4 s. 6 d. by 34 l. 10 s. thus; 4 s. by 34, makes 6 l. 16 s. and 6 d. by 34, makes 17 s. then 4 s. 6 d. by 10 d. or $\frac{1}{2}$, makes 2 s. 3 d. and the total is 7 l. 10 s. 3 d. Or secondly multiply 34 l. 10 s. by 4 s. 6 d. thus; 4 s. 6 d. is 2 s. and 2 s. 6 d. therefore 34 l. 10 s. multiplied by 2 s. or $\frac{1}{10}$, the product is 3 l. 9 s. then by 2 s. 6 d. or $\frac{1}{8}$, it is 4 l. 6 s. 3 d. and the total is, as before, 7 l. 15 s. 3 d. Thus,

| l. | s. | d. | |
|----|----|----|--|
| 34 | 10 | | |
| 3 | 9 | | |
| 4 | 6 | 3 | |
| 7 | 15 | 3 | |

The product of

34 l. 10 s.
by 2 s. or $\frac{1}{10}$
by 2 s. 6 d. or $\frac{1}{8}$

applied to a settlement of Charles VI. emperor of Germany, who, in the year 1722, having no sons, settled his hereditary dominions on his eldest daughter, the archduchess Maria Theresa, which was confirmed by the diet of the empire, and guaranteed by Great Britain, France, the States-General, and most of the powers in Europe.

PRAGMATICAL, a term used sometimes in the same sense as practical, mechanical or problematical.

PRAGUE, the capital of Bohemia, situated on the river Mulda, in east long. 14° 20' north lat. 50°. This is a strong fine city, and, next to London, Paris, and Constantinople, the largest in Europe.

PRAMNION, in natural history, the name of a semi-pellucid gem, so distinct from all others, as to make a peculiar genus of fossils.

This is a very singular stone, and of a

very great concealed beauty: our lapidaries, when they meet with it, call it by the name of the black agate. It is of an extremely close, compact, and firm texture, of a smooth and equal surface, and in shape very irregular; being sometimes round, sometimes oblong, and often flat; in size it seldom exceeds two inches. It appears, on a common inspection, to be of a fine, deep black: but held up against the sun, or the light of a candle, it is an elegant red, clouded by a quantity of subtle black earth. We have it from the East-Indies.

PRASIUM, in botany, a genus of the didynamia gymnospermia class of plants, the corolla whereof consists of a single ringent petal; the upper lip is erect, roundish, absolutely emarginated, and concave; the under one is broader, reflex, and divided into three segments: the fruit consists of four roundish, unilocular berries, in the bottom of the cup: the seeds are roundish and solitary.

PRASIUS, **PRASITES**, in natural history, the name of a gem much approaching to the nature of the emerald, but wanting its hardness, and being of a coarser green, with an admixture of yellow. It is, even in its most perfect state, much less beautiful than most of the other gems, and is found of various sizes, but seldom smaller than a pea or larger than a nutmeg. It is also of various figures, but is never columnar; it is frequently of an orbicular form, flattened on one side and convex on the other, and often oblong or oval, but more usually it is of an irregular shape, made up of a number of flat faces. Its colour is a deep green, usually with a bluish cast, and always with a greater or less admixture of yellow.

PRATIQUE, or **P R A T T I C**, in commerce, a negotiation, or communication, of commerce, which a merchant-vessel obtains in the port it arrives in, and the countries it discovers: hence to obtain a pratique, is to obtain a liberty to frequent a port, to go ashore, to buy and sell, &c.

Pratique is particularly used for a licence to traffic, granted to the master of a ship in the ports of Italy upon a bill of health; that is, a certificate that the place whence he came is not annoyed with any infectious disease.

PRATOLINO, a city of Tuscany, eight miles north of Florence, where the great duke has a palace and gardens, with

some of the finest water-works in Italy.

PRAYER, in theology, a petition put up to God, either for the obtaining some future favour, or the returning of thanks for a past one.

With regard to prayer, Jesus Christ forbids his disciples to lengthen them by vain and impertinent repetitions. The Jews, antiently, when they went to pray, covered their head and face with a veil, as a mark of humility and confusion, when they appeared before the divine presence; the postures they used were either standing, according to the example of holy men recorded in Scripture, or bowing, kneeling, or prostrating. They always turned their faces towards the temple, if they dwelt at Jerusalem; and towards Judea, if they lived elsewhere. The duty of prayer is strongly enforced in the koran. The Turks are directed to pray five times every day. They kneel at prayers, laying their back parts on their heels. The old Lacedaemonians had a peculiar form of prayer: for they never used, either in their public or private devotions, to make any other request than, that the gods would grant whatever was honourable and good for them: there were several ceremonies attending the manner of their supplicating the gods, and the postures they used were different; but the most common was kneeling.

Divines distinguish three kinds of prayer, vocal, which is cloathed in words and sounds, to be uttered by the mouth; mental, which is only formed or conceived in the mind, and not delivered in words; and ejaculatory, which is a short sudden flight, without study, order, or method. Among us prayer is most frequently considered under the divisions of preconceived and extemporary: under the first come all set forms, whether public or private, by which the mind is directed in the order, manner, expression, &c. of its petitions; the second is that where the mind is left to itself, and its own conduct, both as to matter, manner, words, &c. The Romanists prefer prayers to saints, the virgin, the angel Gabriel, &c. See the article **SAINT**, **AVE-MARIA**, &c.

PREACHING, in theology, the promulgation of the word of God in public; or the making a sermon, or public oration on some passage in the sacred Scriptures, in order to inform the judgment and mend the lives of the hearers.

PRE-

PREADAMITE, a denomination given to the inhabitants of the earth who, according to some people, lived before Adam.

Isaac de Pereyra, in 1655, published a book, in which he attempted to prove that the Jews alone were descended from Adam; and that the Gentiles, whom he called Preadamites, lived long before Adam: this book was answered by Demarets, professor of theology at Groningen.

PREAMBLE, in law, the beginning of an act of parliament, &c. which serves to open the intent of the act, and the mischiefs intended to be remedied by it.

PREBEND, the maintenance a prebendary receives out of the estate of a cathedral or collegiate church. Prebends are distinguished into simple and dignitary; a simple prebend has no more than the revenue for its support: but a prebend with dignity, has always a jurisdiction annexed to it.

Theological or divinity **PREBEND**, in France, is a prebend appropriated to a doctor of divinity in each cathedral and collegiate church, for preaching on Sundays, and making a public lecture thrice a week.

Preceptorial **PREBEND**, is a prebend whose revenues are destined for the support of a preceptor or master, who is obliged to instruct the youth of the place gratis.

PREBENDARY, an ecclesiastic who enjoys a prebend.

The difference between a prebendary and a canon is, that the former receives his prebend, in consideration of his officiating in the church; but the latter merely by his being received into the cathedral or college.

Golden **PREBENDARY of Hereford**, called also *prebendarius episcopus*, is one of the twenty-eight minor prebendaries, who has, *ex officio*, the first canon's place that falls. He was antiently confessor of the bishop and cathedral, and had the offerings at the altar; on which account he was called the golden prebendary.

PRECE PARTIUM, in law, the continuance of a suit by consent of both parties.

PRECEDENCE, or **PRECEDENCY**, a place of honour to which a person is entitled: this is either of courtesy or of right. The former is that which is due to age, estate, &c. which is regulated by custom and civility: the latter is settled by authority, and when broken in upon gives an action at law.

The point of precedency is thus settled

by the heralds: after the king, the princes of the blood, as sons, grandsons, brothers, and nephews of the king; then the archbishop of Canterbury, the lord chancellor, or lord keeper of the great seal, the archbishop of York, the lord high treasurer, the lord president of the privy council, the lord privy seal; next dukes, marquises, dukes eldest sons, earls, marquises eldest sons, dukes younger sons, viscounts, earls eldest sons, marquises younger sons, bishops, barons, speaker of the house of commons, viscounts eldest sons, earls younger sons, barons eldest sons, knights of the garter commoners, privy counsellors commoners, the chancellor of the exchequer, chief justice of the king's bench, master of the rolls, chief justice of the common pleas, chief baron of the exchequer, justices and barons of the said courts, viscounts younger sons, barons younger sons, baronets, knights of the bath, field and flag officers, knights bachelors, masters in chancery, doctors graduate, serjeants at law, esquires, gentlemen, citizens, yeomen, burgesses.

The great officers of the court take place above all others of the same order of nobility; viz. the master of the horse, lord great chamberlain of England, lord marshal of England, lord steward of the household, and lord chamberlain of his majesty's household: so the secretaries of state, if peers, take place of all of that degree, except the great officers aforesaid. Dukes, marquises, earls, &c. not having any of the said offices, nor descended of the blood royal, take place according to the seniority of their creation. The ladies take place according to the quality of their husbands.

PRECEDENT, in law, a case which has been determined, and which serves as a rule for all of the same nature: thus the precedents of a court have the force of laws, and no court will reverse a judgment contrary to many precedents.

Precedent also frequently denotes an original authentic instrument or writing, which serves as a form to draw others by.

PRECENTOR, a dignitary in cathedrals, popularly called the chantor; or master of the choir.

PRECEPT, in law, a command in writing sent by a chief justice, justice of the peace, &c. for bringing a person, record, or other matter, before him.

Precept is also used for the command or incitement by which one man stirs up another

another to commit felony, theft, &c.
PRECESSION, *præcessio*, in astronomy, a term applied to a slow motion of the equinoctial points towards the west; that is, in the language of astronomers, *in anteceden tia*, or contrary to the order of the signs. See the article **SIGN**.

This motion of the equinoctial points is occasioned by the poles of the world revolving round those of the ecliptic: in order to illustrate which, let DCH (plate CCVIII. fig. 2.) be a part of the earth's orbit, C its center, EC the axis of the ecliptic, E its pole, CP the axis of the earth, P its pole; through the points E and P draw the great circle EPA, meeting the ecliptic AL in A; the arch PA is equal to the inclination of the axis of the earth to the plane of the ecliptic, *viz.* the angle PCH, which is found by observation to be about $66^{\circ} 30'$, and therefore its complemental arch EP, or angle PCE = $23^{\circ} 30'$.

Through the pole P, from the point E, describe a lesser circle PFG, which will be parallel to the ecliptic; then, if the axis of the earth be directed at any particular time to P, it is found by observations of many years, that it will not be constantly directed to the point P, but in seventy-two years time be directed to some other point Q, so that the arch PQ = 1 degree; and therefore, in the space of $360 \times 72 = 25920$ years, the point P, or pole of the world, will describe the circle PFG, about the pole of the ecliptic E, which revolution is called *annus magnus*, the great year; after which, the stars being re-instated in their proper places, the antients imagined there would be a total renovation of all things. The cause of this conical motion of the earth's axis was unknown to all the astronomers before Sir Isaac Newton's time, none of them being able to guess from whence it could proceed; but this sublime geometer soon investigated its cause, and demonstrated that it results from the laws of motion and gravity, that is, from the spheroidical figure of the earth; for if the earth was a perfect sphere, its axis would always continue parallel to itself, and consequently have no such motion. Hence the reason of the precession of the equinoctial points may be easily conceived; for the circle EPA, passing through both the pole of the ecliptic and equator, will be the solstitial colure, and A the solstitial point, when the axis of the earth points to P; but

after seventy-two years, when it points to Q, then the great circle EQB will be the solstitial colure, and B the solstice. And because the equinoctial points are always ninety degrees distant from the solstices, they must consequently move in the same time, through the same arch, and the same way, *viz.* westward, or in anteceden tia.

This retrograde motion, by carrying the equinoctial points to meet the sun in his apparent annual motion, makes him arrive at them sooner every year than he would do if those points continued immoveable: and this arch of regression being $50''$ a year, or one degree in seventy-two years, makes the equinoxes happen $20'$ in time sooner each year than they would otherwise do. And though this change be not sensible in a few years, yet these points are found to have a very different situation from what they had two thousand years ago.

By reason of this precession of the equinoctial points, the fixed stars seem to move towards the east, and thereby to have their longitude, which is always reckoned upon the ecliptic, from the vernal equinoctial point, encreased: and hence the constellations seem to have deserted the places allotted them by the antient astronomers; for instance, the beginning of the sign aries, which in Hipparchus's time, was near the vernal equinoctial point, and gave name to that point of the ecliptic, is now removed near a whole sign, or thirty degrees, eastward; so that aries is now where taurus used to be, taurus where gemini used to be, &c. and thus all the constellations of the zodiac have changed their antient places; but to avoid confusion, astronomers have thought fit to let the several portions of the ecliptic, where these constellations were at first observed to be, retain their old names; so that the vernal equinoctial point is still reckoned the first degree of aries. However these portions of the ecliptic, where the constellations were at first, are called *anastrea*, to distinguish them from the places where they now are, which are termed *stellata*. See the article **CONSTELLATION**.

PRECIOUS STONES, or **GEMS**, in natural history. See the article **GEM**.

PRECIPE, or **PRAECIPE QUOD REDDAT**, in law, a writ that extends as well to writs of right as to other writs of entry and possession.

It is sometimes called a writ of right close,

N^o.1.

Fig.1. PORCELAIN SHELLS

N^o.2.

N^o.3.

Fig.2. PRECESSION.

Fig.3. PRIMULA Veris,
the COWSLIP



Fig.4. PSYLLIUM.



Fig.5. PTARMICA.



Fig.6. PUTMONARIA.



close, when issued out of the court of chancery close; sometimes a writ of right patent, when it issues out of chancery, patent, or open, to any lords court for any of his tenants deforced, against his deforcer.

PRECIPITANT *precipitans*, in chemistry, is applied to any liquor, which, when poured on a solution, separates what is dissolved, and makes it precipitate, or fall to the bottom of the vessel.

The term precipitant is also used, in medicine, to denote any remedy that moderates the heat of the blood, by separating, as is supposed, any heterogeneous matter contained therein.

PRECIPITATE, *precipitatus*, in chemistry, a substance which having been dissolved in a proper menstruum, is again separated from its solvent, and thrown down to the bottom of the vessel, by pouring some other liquor upon it.

White precipitate of mercury is made thus: take of sal armoniac and of corrosive sublimate, each an equal quantity; dissolve them together in common water, and filtrate the solution through paper: then add oil of tartar per deliquium, enough to cause the matter to precipitate: pour off the water, and add more fresh water several times; and when the powder has been thus perfectly freed from its acrimony, let it be dried for use; which is principally in unguents for cutaneous foulnesses, a dram of it to an ounce of pomatum, being the usual proportion; for if used internally, it not only purges and sometimes vomits, but is very apt to bring on a salivation. See the article SALIVATION.

For the other preparations of mercury, improperly called precipitates, see the article MERCURY.

PRECIPITATION, *precipitatio*, a process in chemistry, which is a kind of separation, whereby the particles of a body dissolved and suspended in any menstruous liquor, are detached therefrom, and fall down to the bottom of the vessel. These particles sometimes precipitate of their own accord, but oftener by the assistance of some other liquor added to the menstruum. So that precipitation is the reseparating solid bodies from any fluid menstruum, wherein they are dissolved, by the addition of a third body, which, counteracting the power of the menstruum, causes that which was dissolved to regain its solid form, and subside in the state of a powder.

The great law of precipitation, according to Dr. Shaw, is this; whenever one body has dissolved another, and a third be added to the solution; which third has a greater relation to either of the former, than they have to each other; then the union of the two first will be dissolved, and the third uniting itself either with the first or second, leaves the other at liberty to fall to the bottom, or rise to the top, according to its specific gravity: thus if camphor be dissolved in spirit of wine, and water be added to the solution, it is thereby made to float upon the surface; because there is a greater appetite of union between water and the spirit of wine, than there is between camphor and that spirit.

As precipitation is apparently opposite to solution, its application must be necessarily founded on the same principles. The manner of its performance is a simple commixture of the precipitant with the solution to be precipitated; only with this caution in respect to bodies which produce much ebullition on their mixture, that the precipitant should be added gradually, lest they overflow the vessel.

After the precipitated sediment is perfectly formed, it must be recovered from the fluid by a proper method of exsiccation; to which, in the case of saline bodies, edulcoration is likewise previously necessary. This is best performed by filtering off the fluid and laying out the wet powder, when of a consistence, in drops or pieces, as was before directed in the preparation of powders by levigation.

To account for the process of precipitation. A fluid menstruum may be made to sustain a body specifically heavier than itself, either by making the resistance arising from the cohesion of the parts of the fluid equal to the excess of specific gravity of those bodies above that of the menstruum; or by the heavy bodies being joined to some lighter one; so that the two together only make one whole equal in weight to the fluid. In the first case, we know the resistance is still proportional to the surface of the corpuscles; so that the surface being diminished, the resistance is weakened: the proportion therefore of the tenacity of the menstruum to the gravity of the corpuscles being thus destroyed, a precipitation must ensue.

Boerhaave makes the following observations

tions on the different manner in which precipitation is performed by several different agents. 1. By water poured on oils dissolved in alcohol, where the liquor turns milky. 2. By water poured to solid resins dissolved in alcohol, where also the liquor turns milky. 3. By water in the distillation of oily spirits, if any water run after the spirit is drawn off. 4. By acids on acids; thus silver and mercury are precipitated out of spirit of nitre, in which they have been dissolved by adding spirit of salt. 5. By metals with metals, and other bodies. Thus, for example, dilute an ounce of silver dissolved in spirit of nitre, with twelve times the quantity of rain-water; put polished plates of copper into this liquor, and the silver will be precipitated, and the copper dissolved: then put this solution of copper into another glass, and add to it polished plates of iron; the copper will be precipitated and cast over the iron; finally, the copper falls to the bottom, and the iron dissolves. Pour this solution of iron into a fresh glass, and drop upon it oil of tartar per deliquium; the dissolved iron immediately falls to the bottom, and the alkali unites with the acid, and regenerates true nitre, after so many changes. Thus does this salt travel from one body to another almost unaltered, though it is more attracted by one than another, till at length it rests in that which in this respect is the strongest, and is from thence expelled, when oil of vitriol is poured upon the nitre thus regenerated. On these two principles precipitation depends, and is the true and often abstruse cause of numberless wonderful operations, both in art and nature. Take a grain of white or red precipitate, rub it upon a polished and heated copper-plate, and wherever the matter has passed, the copper will immediately look like silver; for the copper attracts the acid of the nitre from the calx of the mercury, and thus presently makes an amalgam upon the surface of the copper, and then acquires a silver colour. 6. Alkalies often precipitate things dissolved by acids. This happens frequently, but not always, nor in perfection: alkali precipitates copper dissolved by an acid, but the copper is afterwards dissolved by a salt made of the two. 7. Acids generally precipitate things dissolved by alkalies; but in this case also there are some processes which

shew us exceptions. 8. Sharp salts, without being changed, and lying perfectly concealed, have strange and unexpected effects by means of precipitation. If an ounce of luna cornea, which is perfectly scentless, insipid, and unactive, and affords no sign of acrimony in the fire, be ground, and united in a strong heat in a glass retort with half an ounce of inodorous and perfectly insipid regulus of antimony, there instantly arises an extremely strong poison, or an exceedingly corrosive butter of antimony, the exhalation of which proves mortal. We see in this one instance how dangerous the art of mixing is, and with what care we ought to go about the compounding of bodies.

PRECIPUT, or **PRÆCIPUATÈ**, in the french jurisprudence, denotes the right of primogeniture among coparceners, whereby the eldest has always the principal fief, or manor.

PRECISION, *præcisio*, among logicians, the same with abstraction. See the article **ABSTRACTION**.

PRECONISATION, in the consistory of Rome, a declaration made by the cardinal-patron, or protector, of a person nominated by some prince to a prelature, by virtue of letters-patent, whereof he is the bearer; with which the pope complying, gives his collation. See the article **COLLATION**.

PRECONTRACT, in law, properly signifies a contract made before another, but is chiefly applied to marriage-contracts. See **CONTRACT** and **MARRIAGE**.

PRECOP, an old decayed city of european Turkey, situated at the entrance of the Isthmus which unites Little Tartary to the peninsula of Crim Tartary: east longitude $37^{\circ} 40'$, north latitude $46^{\circ} 40'$.

PRECORDIA, *præcordia*, in anatomy, a general name for the parts situated about the heart, in the fore-part of the thorax as the diaphragm, pericardium, and even the heart itself, with the spleen, lungs, &c. See **HEART**, **DIAPHRAGM**, &c.

PRECURSOR, *præcursor*, in theology, denotes a fore-runner, or person who goes before any one to notify his coming. The term precursor, however, is peculiarly applied to St. John the Baptist, who is styled the precursor of Jesus Christ.

PREDECESSOR, properly signifies a person who has preceded or gone before another in the same office or employment;

ment; in which sense, it is distinguished from ancestor. See ANCESTORS.

PREDESTINATION, in general, signifies a decree of God, whereby, from all eternity, he ordained such a concatenation of causes as must produce every event by a kind of fatal necessity, and maugre all opposition. See the articles FATE, NECESSITY, &c.

In this sense, the Turks are great predestinarians; and on this account are much more daring in battle, and willingly encounter greater dangers than they would otherwise do. See MAHOMETANS.

Predestination, among christians, is used in a more limited sense, for a judgment or decree of God, whereby he has resolved, from all eternity, to save a certain number of persons, from thence called elect; so that the rest of mankind being left in a state of impenitence, are said to be reprobated. See REPROBATION.

Nothing has occasioned more disputes than this thorny subject of predestination; the lutherans speak of it with horror, whilst the calvinists contend for it with great zeal; the molinists and jesuits preach it down as a most dangerous doctrine, whilst the jansenists assert it as an article of faith; the arminians, remonstrants, and pelagians, are all avowed enemies to predestination. See LUTHERANS, CALVINISTS, JESUITS, &c.

PREDETERMINATION, in philosophy, that concurrence of God, which determines men in all their actions, both good and evil; and this concurrence, or influence, is called physical predetermination, or premotion: for divines maintain, that God has no share in the sins of mankind, inasmuch as he only affords his concurrence to the physical part of their actions, not to the moral part.

But whether even such a physical concurrence be necessary, is strongly controverted. The scotists urge, that all natural causes are, of their own natures, determined to certain actions; whence it should seem needless to call in any farther assistance: for the nature of fire, for instance, being to warm things properly applied to it; when any thing is so applied, what occasion for any foreign influence to cause the fire extert its heat upon it? Again, this predetermination seems still less requisite to produce human actions; since the soul must be at least allowed the common privilege of a second cause, and to produce its own actions as well as other strictly natural agents. See

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the articles WILL and CAUSE.

The thomists, on the other hand, strongly assert physical predetermination, arguing from the subordination of second causes to the first: for, say they, where there are several subordinate causes, the lower do not act unless moved thereto by the first. Another argument they draw from the dominion of God; for according to them, the essence of all dominion consists in directing and applying things subject thereto, to its own operations; if the dominion be moral, morally; and if it be also physical, physically.

PREDIAL TITHES, are those that are paid of things arising and growing from the ground only; as corn, hay, fruit, &c. See the article TITHES.

PREDICABLE, among logicians, denotes a general quality which may be predicated, or asserted of several things: thus animal is predicable of mankind, beasts, birds, fishes, &c.

Predicables are only general or abstract ideas, for a farther account of which, see the articles ABSTRACT, IDEA, and GENERAL TERMS.

The schoolmen reduce predicables to five classes, *viz.* genus, species, proprium, difference, and accidens. See the articles GENUS, SPECIES, &c.

PREDICAMENT, among logicians, the same with category. See CATEGORY.

PREDICATE, *prædicatum*, in logic, that part of a proposition which affirms or denies something of the subject: thus, in these propositions, *snow is white, ink is not white*, whiteness is the predicate which is affirmed of snow, and denied of ink. See the article PROPOSITION.

It is a celebrated law in predicates, that nothing is esteemed to be absolutely affirmed of another, unless it be affirmed in such a manner, as wants nothing either in the subject, predicate, or copula to make it true.

This also is a noted property of a predicate, that it contains in some measure its own subject; thus metal contains gold, silver, copper, &c. of which it is predicated.

Every predicate is indeed an attribute; but every attribute is not a predicate; thus soul, learning, are attributed to man, but not predicated of him.

PREDICATING, in logic, the act of affirming or denying something of a thing, as a man is not an angel; body is a substance, &c.

Things predicated of others are reducible,

ble, 1. To genera, as animal, of a man, &c. 2. Forms, as whiteness, of snow, &c. And, 3. Equals, of things of equal extent, as species, difference, property, &c.

The schoolmen distinguish several ways of predicating, as, 1. In quod tantum, which is to predicate essentially, both as to the thing and manner, as *honour is a virtue*. 2. In quale tantum, which is to predicate accidentally, both as to the thing and manner, as *John is a scholar*. And, 3. In quale quid, or in quale post quid, which is to predicate both essentially and accidentally, as *man is rational*.

PREDICTION, *prædictio*, the foretelling of what is to come, either by divine revelation, art, or conjecture.

PREDOMINANT, *prædominans*, that which prevails, or has some superiority, over another thing.

PRE-EMPTION, *præemptio*, a privilege antiently allowed the king's purveyor, to have the first buying of corn, &c. for the king's household, but taken away by stat. 19 Car. II.

PREENING, in natural history, the action of birds dressing their feathers, to enable them to glide the more readily through the air, &c.

For this purpose they have two peculiar glands on their rump, which secrete an unctuous matter into a bag that is perforated, out of which the bird occasionally draws it with its bill.

PRE-EXISTENCE, *præ-existētia*, the state of a thing actually in being before another.

PREFACE, *præfatio*, something introductory to a book, to inform the reader of the design, method, &c. observed therein; and generally whatever is necessary to facilitate the understanding of a book.

Prefacing is a peculiar species of writing, being neither argumentation, discourse, narration, nor apology.

PREFECT, *præfectus*, in antient Rome, one of the chief magistrates who governed in the absence of the kings, consuls, and emperors.

This power was greatest under the emperors. His chief care was the government of the city, taking cognizance of all crimes committed therein, and within a hundred miles. He judged capitally and finally, and even presided in the senate. He had the superintendence of the provisions, building, and navigation.

The prefect of modern Rome differs little

from the antient præfectus, his authority only extending to forty miles round the city.

PREFECT of the prætorium, *præfectus prætorii*, the leader of the prætorian bands destined for the emperor's guards, consisting, according to Dion, of 10,000 men. This officer, according to Suetonius, was instituted by Augustus, and usually taken from among the knights.

By the favour of the emperors his power grew very considerable; to reduce which, Constantine divided the prefecture of the prætorium into four prefectures, and each of these again he subdivided into civil and military departments, though the name was only reserved to him who was invested with the civil authority, and that of comes belli given him who commanded the cohorts.

PREFIX, or AFFIX, in grammar, a particle added at the beginning of a word, either to diversify its form, or to alter its signification.

PREGNANCY, *graviditas*, the state of a woman who has conceived, or is with child. See the articles **GENERATION**, **CONCEPTION**, **FOETUS**, &c.

The stopping of the menstrual discharge, is the first sign of pregnancy; then a swelling of the belly, in a globose, not irregular, protuberant figure; and about the twentieth week of pregnancy, the motion of the foetus: and, indeed, this motion is the only certain symptom, by which a living foetus can be distinguished from a mole. See the article **MOLE**. The several disorders incident to pregnant women, as hæmorrhages, flatulencies, hæmorrhoids, &c. are treated of under their respective articles **HÆMORRHAGE**, **FLATULENCY**, &c.

But more especially the article **ABORTION** ought to be consulted, where the means of preventing this dangerous, and but too often fatal accident, are particularly considered.

And as to the methods of delivery, and the treatment both of the mother and child during the time of lying-in, &c. they may be found under the articles **DELIVERY**, **INFANT**, **LOCHIA**, **LYING-IN WOMEN**, &c.

Negative PREGNANT, in law. See the article **NEGATIVE**.

PREJUDICE, *præjudicium*, does not mean a judgment merely as prior to another in respect of time, but as being passed before the things were duly considered and fully understood. Hence prejudice

is sometimes called anticipation, and a preconceived opinion; and makes one of the many causes of error. See ERROR.

PRELATE, an ecclesiastic raised to some eminent and superior dignity in the church; as bishops, archbishops, patriarchs, &c. See BISHOP, &c.

PRELIMINARY, in general, denotes something to be examined and determined, before an affair can be treated of to the purpose.

The preliminaries of peace consist chiefly in settling the powers of ambassadors, and certain points in dispute, which must be determined previous to the treaty itself. See the articles EMBASSADOR, TREATY, &c.

PRELUDE, *præludium*, in music, is usually a flourish or irregular air, which a musician plays off-hand, to try if his instrument be in tune, and so lead him into the piece to be played. Very often the whole band in the orchestra run a few divisions, to give the tune.

PREMISES, or **PREMISSSES**, *præmissæ*, in logic, an appellation given to the two first propositions of a syllogism, as going before, or preceding the conclusion. See the article SYLLOGISM.

Premises are the foundation or principles of our reasoning; which being either self-evident or demonstrative propositions, the truth of the conclusion is equally evident.

PREMISES, in law, properly signifies the land, &c. mentioned in the beginning of a deed. See the article DEED.

PREMISLAW, a city of Poland, in the province of Red Russia, situated 110 miles south-east of Cracow: east long. 22°, north lat. 49°.

PREMIUM, or **PRÆMIUM**, properly signifies a reward or recompence; but it is chiefly used in a mercantile sense for the sum of money given to an insurer whether of ships, houses, lives, &c. See the article INSURANCE.

The term premium is also applied to what is given for a thing above par, or prime cost; thus if lottery tickets sell for 20 s. more than prime cost, or the price at which the government issued them, this 20 s. is called a premium.

Some also use premium in a synonymous sense with bounty. See BOUNTY.

A lender of money accepting a voluntary premium from the borrower on payment of principal and interest, shall not be within the statutes against usury. See the article USURY.

PREMONSTRATENSES, in church-history, a religious order, instituted by St. Norbert, about the year 1119.

PREMOTION, *præmotio*, the same with predetermination. See the article PRE-DETERMINATION.

PREMUNIENTES, in law, writs dispatched to the bishops, to call them to parliament; warning them to bring with them the deans and archdeacons, one proctor for each chapter, and two for the clergy of each diocese. See the article CONVOCATION.

PREMUNIRE, or **PRÆMUNIRE**, in law, is taken two ways; either for a writ, or for the offence for which it is granted.

Formerly the church of Rome carried its pretended right of supremacy to such a height, that several statutes were made to check and restrain the growing power of the pope; but more especially stat. 16 Rich. II. c. 5. commonly known by the name of the statute of premunire, which ordains the punishment of offenders on this statute to be this: that they should be out of the king's protection, attached by their bodies, *i. e.* imprisoned at the king's pleasure, and lose their lands, goods, and chattels.

Premunire is now chiefly used for the above punishment, which is incurred not only by those who assert the pope's supremacy; but also by those who refuse to take the oath of allegiance, or of the king's supremacy, &c.

It is said no person, who has incurred a premunire, can bring any action; and a writ of premunire lies as well for a party grieved, as for the king; but the laws making offences a premunire are so very severe, that they are seldom put in execution.

PRENANTHES, in botany, a genus of the syngenesia-polygamia æqualis class of plants, the compound flower of which is not imbricated, but consists of five equal hermaphrodite flowers, which are monopetalous, ligulated, quadridentated, and placed in a single circle; the seeds are single, or one after each flower, cordated, and contained in the cup.

PRENDER, in law, signifies the power or right a person has to take a thing, before it is offered.

And prender de baron, literally signifies to take a husband; but in law it is used as an exception, to disable the widow from pursuing an appeal of murder, against one who had killed her former husband.

PRENOMEN, *prænomen*, among the ancient Romans, a name prefixed to their family-name, answering to our christian name: such are Caius, Lucius, Marcus.

PRENOTION, *prænotio*, a piece of knowledge, naturally preceding some other; as the knowledge of the antecedent; which must precede that of the consequent.

PREPARING MEDICINES, *præparantia medicamenta*, such as prepare the morbid humours, and dispose them to separate from the healthy, and pass off by evacuation.

Some have also given the appellation of preparing vessels, *vasa præparantia*, to the spermatic vessels. See the articles **GENERATION** and **SPERMATIC**.

PREPARATION, *præparatio*, in mathematics, something preparatory to the demonstration of a proposition. Thus if a proposition in geometry is to be demonstrated, the preparation consists in drawing certain lines; and if a proposition in arithmetic, in some computation to be previously made to come at the demonstration.

PREPARATION, in pharmacy. &c. the manner of preparing and managing any medicine, in order to fit it to serve the purposes for which it is intended.

The operations which go by this name are various, as decoction, infusion, calcination, sublimation, &c. See the article **DECOCTION**, &c.

PREPARATION, in anatomy, the art of preserving the parts of animals for anatomical uses; which is done either by drying them thoroughly, or putting them in a proper liquor.

In drying parts which are thick, when the weather is warm, care must be taken to prevent putrefaction; fly-blows, insects, &c. This is easily done by the use of a solution of corrosive sublimate in spirit of wine, in the proportion of two drachms of sublimate to a pound of spirit: the part should be moistened with this liquor as it dries; and by this method the body of a child may be kept safe even in summer. Dried preparations are apt to crack and moulder away in keeping; to prevent this their surface should be covered with a thick varnish, repeated as often as occasion requires.

Though several parts prepared dry are useful, yet others must be so managed as to be always flexible, and nearer a na-

tural state; which may be done in a well rectified colourless spirit of wine, to which is added a small quantity of the spirit of vitriol or nitre. When these are properly mixed, they neither change their colour nor the consistence of the parts, except where there are serous or mucous liquors contained in them. The brain, even of a young child, in this mixture grows so firm as to admit of gentle handling, as do also the vitreous and chrystaline humours of the eye. The liquor of the sebaceous glands and the semen, are coagulated by this spirituous mixture; and it heightens the red colour of the injection of the blood-vessels, so that after the part has been in it a little time, several vessels appear which were before invisible. If you will compare these effects with what Ruysch has said of his balsam, you will find the liquor above-mentioned to come very near to it. The proportion of the two spirits must be changed according to the part prepared: for the brain and humours of the eye, you must put two drachms of spirit of nitre to one pound of spirit of wine. In preserving other parts which are harder, thirty or forty drops of the acid will be sufficient; a larger quantity will make bones flexible, and even dissolve them. The part thus preserved should be always kept covered with the liquor, therefore great care should be taken to stop the mouth of the glass with a waxed cork and a bladder tied over it, to prevent the evaporation of the spirit.

Some prefer malt-spirit to spirit of wine, because this last is apt to change into a brown colour; whereas the malt-spirit never loses its limpid appearance.

PREPENSED, *præpensus*, in law, denotes fore-thought: thus when a man is slain upon a sudden quarrel, if there was malice prepensed formerly between them, it makes it murder.

PREPOSITION, *præpositio*, in grammar, one of the parts of speech, being an indeclinable particle which yet serves to govern the nouns that follow it; such as *per*, *pro*, *propter*; and *through*, *for*, *with*, &c.

F. Buffier allows it to be only a modificative of a part of speech, serving to circumstantiate a noun.

PREPOSITUS *villæ*, sometimes denotes the chief officer of the king in a town, manor, or village. In antient records,

he was no more than the lord's bailiff; he is also, in later writers, the constable or petty constable.

PREPUCE, *præputium*, in anatomy, the foreskin; being a prolongation of the cutis of the penis, covering the glans. See the article **PENIS**.

PREROGATIVE, *prærogativa*, a pre-eminence which one person has over another.

PREROGATIVE of the king, *prærogativa regis*, that power which the king hath, not only over other persons, but over the ordinary course of the common law, in right of his crown.

Such as, that he may pardon a person condemned to die, that the king's person is subject to no man's suit, his possessions cannot be taken from him by any violence, his goods are subject to no tribute, nor deftrainable, &c.

PREROGATIVE-COURT, a court belonging to the archbishop of Canterbury, wherein wills are proved and administrations granted that belong to the archbishop by his prerogative; that is, where the party, at his death, had five pounds, or upwards, out of the diocese where he died, and within the archbishop's province. See **WILL**, **PROBATE**, &c.

All citations and decrees run in the archbishop's name.

This court is kept in the common-hall in Doctors-commons, in the afternoon, next day after the Arches. The judge is attended by the register, who sets down the acts of the court, keeps records, original wills, &c. It is called the prerogative-office, now kept in Deans-court, London.

The archbishop of York hath also the like court, called his exchequer.

PRESA, in the italian music, a character or mark shewing when and where a performer in a concert is to begin to sing or play: but in particular, in fugues or canons, it is thus marked + over the note at which the second part, which is to follow or imitate the first, must begin. If the mark be repeated a second time, it is to shew the place where the third part must begin, to imitate the second; and so on through all the parts.

PRESAGE, *præsagium*, in antiquity, denotes an augury, or sign of some future event; which was chiefly taken from the flight of birds, the entrails of victims, &c. See **AUGURY** and **ARUSPICES**. Among physicians, the term presage is

sometimes used for prognostic sign. See the article **PROGNOSTIC**.

PRESBURG, the capital of Hungary, a large city, on the north side of the Danube, fifty miles east of Vienna: east long. 17° 30', north lat. 48° 20'.

PRESBYS, in ornithology, a name by which some have called the regulus cristatus, or golden crowned wren.

PRESBYTA, *πρεσβυτης*, in optics, a person whose eyes being flat, can see distant objects distinctly, but those near confusedly; which defect of sight got this appellation, because old people are naturally subject to it.

Spectacles, or convex glasses, are the only remedy for this defect; for if these are well fitted to the degree of flatness of the eyes, they cause the rays of light to converge in such a manner from near objects, as to make them fall exactly on the retina, and thereby produce distinct vision. See the article **VISION**.

PRESBYTER, in the primitive christian church, an elder, one of the second order of ecclesiastics; the other two being bishops and deacons. See the articles **BISHOP** and **DEACON**.

Presbyter, or elder, is a word borrowed from the greek translation of the old testament, where it commonly signifies ruler or governor; it being a note of office and dignity, not of age, and in this sense bishops are sometimes called presbyters in the new testament. The presbyters might baptize, preach, consecrate and administer the eucharist in the bishop's absence, in his presence, if he authorized and deputed them; and the bishops did scarce any thing in the government of the church without their advice, consent and amicable concurrence.

The grand dispute between the followers of the geneva and roman discipline is about the sameness and difference of presbyters and bishops at the time of the apostles.

PRESBYTERIANS, a sect of protestants, so called from their maintaining that the government of the church appointed in the new testament was by presbyteries; that is, by ministers and ruling elders, associated for its government and discipline.

The presbyterians affirm, that there is no order in the church as established by Christ and his apostles, superior to that of presbyters; that all ministers, being ambassadors of Christ, are equal by their

com-

commission; and that elder or presbyter, and bishop are the same in name and office: for which they alledge, *Acts* xx. 28, &c.

The only difference between them and the church of England, relates to discipline and church-government. Their highest assembly is a synod, which may be provincial, national, or oecumenical; and they allow of appeals from inferior to superior assemblies; according to *Acts* xv. 2, 6, 22, 23. The next assembly is composed of a number of ministers and elders, associated for governing the churches within certain bounds. This authority they found upon *Acts* xi. 30. *Acts* xv. 4, 6, &c. The lowest of their assemblies or presbyteries, consists of the minister and elders of a congregation who have power to cite before them any member, and to admonish, instruct, rebuke and suspend him from the eucharist. They have also a deacon, whose office is to take care of the poor.

The ordination of their ministers is by prayer, fasting, and imposition of the hands of the presbytery. This is now the discipline of the church of Scotland.

PRESCIENCE, in theology, fore-knowledge, or the knowledge which God has of events before they come to pass.

PRESCRIPTION, in law, is a right or title acquired by use and time, introduced for assuring the property of effects, in favour of persons who have for a certain time had them in their possession. Prescription has been called, a penalty imposed by the laws upon negligence; but the law of prescription does not punish the indolence of proprietors, but only interprets their silence for their consent; presuming that a man who neglects to assert his right for a series of years, gives it up. In the common law, prescription is usually understood of a possession from time immemorial, or beyond the memory of man: but in the civil law, and even in our common law, there are prescriptions of a much shorter date. See the article **POSSESSION**.

The things a person may make title to by prescription are, a fair, market, toll, way, water, rent, common, park, warren, franchise, court-leet, waifs, estrays, &c. There is likewise a prescription against actions and statutes: thus by the 31 Eliz. c. 1. it is ordained that all actions, &c. that are brought upon statutes, the penalty whereof belongs to the king, shall be brought within two years after

the offence is committed, or shall be void. By our statutes also, a judge or clerk convicted of false entering of pleas, &c. may be sued within two years; but the crime of maintenance or embracery, whereby perjury is committed by a jury, must be prosecuted within six days, or otherwise the parties prescribe. See the articles **LIMITATION** and **ACTION**.

PRESCRIPTION, in medicine, is the assigning a proper and adequate remedy to a disease, from an examination of its symptoms, and an acquaintance with the virtues and effects of the *materia medica*.

Quincy gives the following directions in relation to prescriptions. In all chronic cases, medicines are to be contrived as near to a diet, as possible, and therefore the common drinks and foods are to be medicated as far as they will admit, and the case requires. But in acute cases, which are generally dangerous, all assistance must be called in that can be had, according to the exigency of the case; and as medicines of efficacy are here made use of, they are most safely distributed into boles or draughts, in order that the dose may be ascertained to the greatest exactness, especially where opiates are used: care is here to be taken to set all the helps to co-operate together, so that they may not interfere with each other: thus a bole or a powder may be given every three, four, or six hours, with a draught, julep, or any other liquid form after it; and herein may be dropt spirits, tinctures, &c. of the like intention, and also into their common drink: and the night-doses, or others, if necessary, may be joined with an opiate: externals, if necessary, may also be ordered at the same time; and if blisters are applied, as they frequently occasion stranguries and heat of urine, emulsions may come in for common drink. Known medicines should be disguised as much as possible, and all extemporaneous medicines be contrived, not only with all the elegance and pleasantness possible, but also into the smallest doses they are capable of: thus draughts to grown persons ought never to exceed four ounces, and to be seldom above three, and boles ought seldom to weigh above two drams. But the most general and necessary rule in all cases is, to answer the end by as few medicines as possible, and never to make a cure worse than the disease.

PRESENCE, *praesentia*, a term of relation

tion used in opposition to absence, and signifying the existence of a person in a certain place, or the state of a person considered as co-existing with another. In this sense, an obligation is said to be passed in presence of a notary and witnesses. At the breaking open the seal of a minor or absent person, the presence of a substitute is necessary: where a superior magistrate is present, it sometimes takes away the power of an inferior. It has been held, that the presence of one feoffee may serve for all the rest.

PRESENTANO, a town of Italy, twenty-eight miles north of Naples.

PRESENT, *præsens*, in grammar, the first tense of a verb, expressing the present time, or that something is now performing; as *scribo*, I write, or am writing. See the article **TENSE**.

PRESENTATION, in law, the act of a patron offering his clerk to be instituted in a benefice of his gift, the same being void.

All persons that have ability to make a purchase or grant, may also present to vacant benefices in their gift; though where a clergyman is patron of a church, he cannot present himself; but may pray to be admitted by the bishop, and the admission shall be effectual. An infant of any age may also present in his own name; but a presentation by a feme covert, must be in the name of both husband and wife. As coparceners make but one patron, they are either to present jointly, or the eldest may present first, and the rest in their turn. Joint-tenants must also join in a presentation; and when a corporation presents, it must be under their common seal. Aliens born and papists cannot present to benefices, which are presented to by the universities; but a popish recusant may grant his patronage to another, who may present where there is no fraud.

A patron may revoke his presentation before institution, but not afterwards: and a right of presenting to the next avoidance of a church, whether granted by will or deed, will pass; but a presentation whilst the church is full, is judged void.

PRESENTE'E, the clerk presented to a benefice by the patron. See the article **PRESENTATION**.

PRESENTMENT, in law, a denunciation of jurors, or a justice of the peace, or other officers, without any information of an offence inquirable by the court,

to which it is presented; or it may be said to be an information made by the jury in a court before a judge, who has authority to punish any offence committed contrary to law; and it is what the grand jury finds and presents to the court, without any bill of indictment delivered: yet it is afterwards reduced into the form of an indictment. A presentment is drawn up in a short note by the jurors, as an instruction to draw the indictment by it; and presentments are made by justices of the peace, in their sessions of offences against statutes, in order to their punishment in the superior courts; and also in courts-leet and courts-baron, before the stewards thereof; as likewise by constables, church-wardens, surveyors of highways, &c. of matters belonging to their respective offices.

Affixe of darrein **PRESENTMENT**. See the article **QUARE**.

PRESENTS, in law, the same with benefices, or free gifts; especially those given by the clergy, or the states of the realm, to the king.

PRESEPE, or **PRÆSEPE**, in astronomy, the name given to three nebulous stars in the breast of cancer. See **CANCER**.

PRESERVATION, in general, denotes the art of preserving things in a state of perfection; or, at least, from being so far corrupted and spoiled, as to be no longer useful.

Animal substances are preserved by curing, pickling, drying, or chemical preparation. See the articles **CURING**, **PICKLE**, **PREPARATION**, &c.

For the method of preserving corn in granaries, see **CORN** and **GRANARY**.

Fruits may be long preserved in spirit of wine, first well saturated with the skins and tinging parts of those fruits; and many may be tolerably preserved in perfectly fermented liquors, which generate no more air. The more solid vegetable substances may be preserved by gently drying in the sun, shade, or other slack heat. Thus peas or beans may be dried young in a slack oven in their proper season; and may afterwards be boiled in the winter, and will eat young and tender, as if just gathered. The ways of preserving fruits, both dry and moist, with sugar, are now universally known; and there are in the several ways many secrets in the hands of particular artists, which it would be well to have generally known. See the article **FRUIT**.

As for the methods of curing and preserving

serving vegetable juices and liquors by decoction, inspissation, fermentation, clarification, matching, &c. See DECOC-TION, INSPISSATING, &c.

PRESERVATIVE, among physicians, denotes a medicine taken by way of pre-caution; or, to secure a man from a disease that threatens him.

The principal preservatives, according to Boerhaave, are abstinence, quiet, drinking warm water; and, after this, a gentle and continued motion till the first appearance of sweat; then a pro-found sleep, the body being well co-vered.

In the time of a plague, preservatives are very necessary against the contagion of the air.

Generous wines, cardiacs, and sudori-fics, are also powerful preservatives.

PRESIDENT, *præses*, an officer created or elected to preside over a company, in contradistinction to the other members, who are called residents.

The lord president of the council is the fourth great officer of the crown, as an-tient as king John, when he was stiled conciliarius capitalis. His office is to attend on the king, propose business at the council table, and report the transac-tions there to the king. See COUNCIL. The lord president of the court of session, in Scotland, is the first of the fifteen lords, who presides in that august assembly, which is the supreme court of justice in that kingdom. See SESSION.

PRESIDIAL, a bench of judges establish-ed in the several cities of France, to judge ultimately of all the causes brought be-fore them by way of appeal from the subaltern judges.

The edict of 1551 establishes presidials thus: 1. That they may judge defini-tively to the sum of two hundred and fifty livres, or ten livres per annum. 2. To the sum of one thousand five hundred livres by provision.

PRESIDII, a small territory in Italy, on the coast of Tuscany, called *State del presidii*, or the garrisons; consisting of several towns garrisoned by the king of Spain, of which the chief are Orbitello, Porto Hercole, and Telamon.

PRESS, *prelum*, in the mechanic arts, a machine of wood, or iron, serving to squeeze any body very close. Thus, let A B plate CCX. fig. 2, be a cheese-press; where C E, F G, are levers moveable about the points, D, E, F, G, by apply-ing the hand at C; S, the stone, or

weight; and H, the cheese to be pressed. Now if $CD = 5$, $DE = 2$, $FG = 6$, $GH = 2$, $FR = 1$, $FH = 4$; then in the lever C E, D is the fulcrum. Call the power at C 1; then the force at E or F is $\frac{5}{2}$. And in the lever F G, whose fulcrum is G, if the power at F be 1, the force at R is $\frac{6}{5}$; and therefore the power at C is to the weight S, as 1 to $\frac{5}{2} \times \frac{6}{5}$, or 3. Also the weight of the stone at R is to the pressure at H, as 2 to 5, or 1 to $\frac{5}{2}$; and the power at C is to the pressure at H, as 1 to $3 \times \frac{5}{2}$, or $7 \frac{1}{2}$.

Presses usually consist of six pieces; two flat smooth planks, between which the things to be pressed are laid; two screws or worms fastened to the lower plank, and passing thro' two holes in the upper; and two nuts in form of an S, that serve to drive the upper plank, which is move-able, against the lower which is fixed. Presses used for expressing liquors are in most respects the same with the common presses, only the under plank is perfo-rated with a great number of holes for the juice to run through. Others have only one screw or arbor, passing through the middle of the moveable plank, which descends into a kind of square box, full of holes, through which the juices flow, as the arbor is turned.

But that the reader may be enabled to form a more distinct idea of these presses, we shall give a draught of the common and great wine-press used for squeezing the juice out of grapes.

A B (plate CCIX. fig. 1.) is the base or pedestal and other supporters of the com-mon wine-press. C, C, the cheeks, which are upright beams, the lower ex-tremities of which are sunk in the earth, where they are strongly fixed by cross-bars and masonry: they are traversed at top by two beams, the lowermost of which is the nut, or receptacle of the screw. D is the screw with its wheel. E the bearer, or large piece of timber on which the wheels rest, in order to sink the beams crossing the planks that cover the grapes, F. G, G, the maye, or planks on which the grapes are disposed, in order to be squeezed: these planks are cut in notches, to receive the liquor and convey it to a vessel appropriated to re-ceive it. The maye is supported on a massive work of masonry. H is the wheel that serves to force down the screw and bearer upon the grapes, which are laid upon the maye in a square heap: this it does by winding off the cord from the

Fig. 1. The common *WINE-PRESS*.

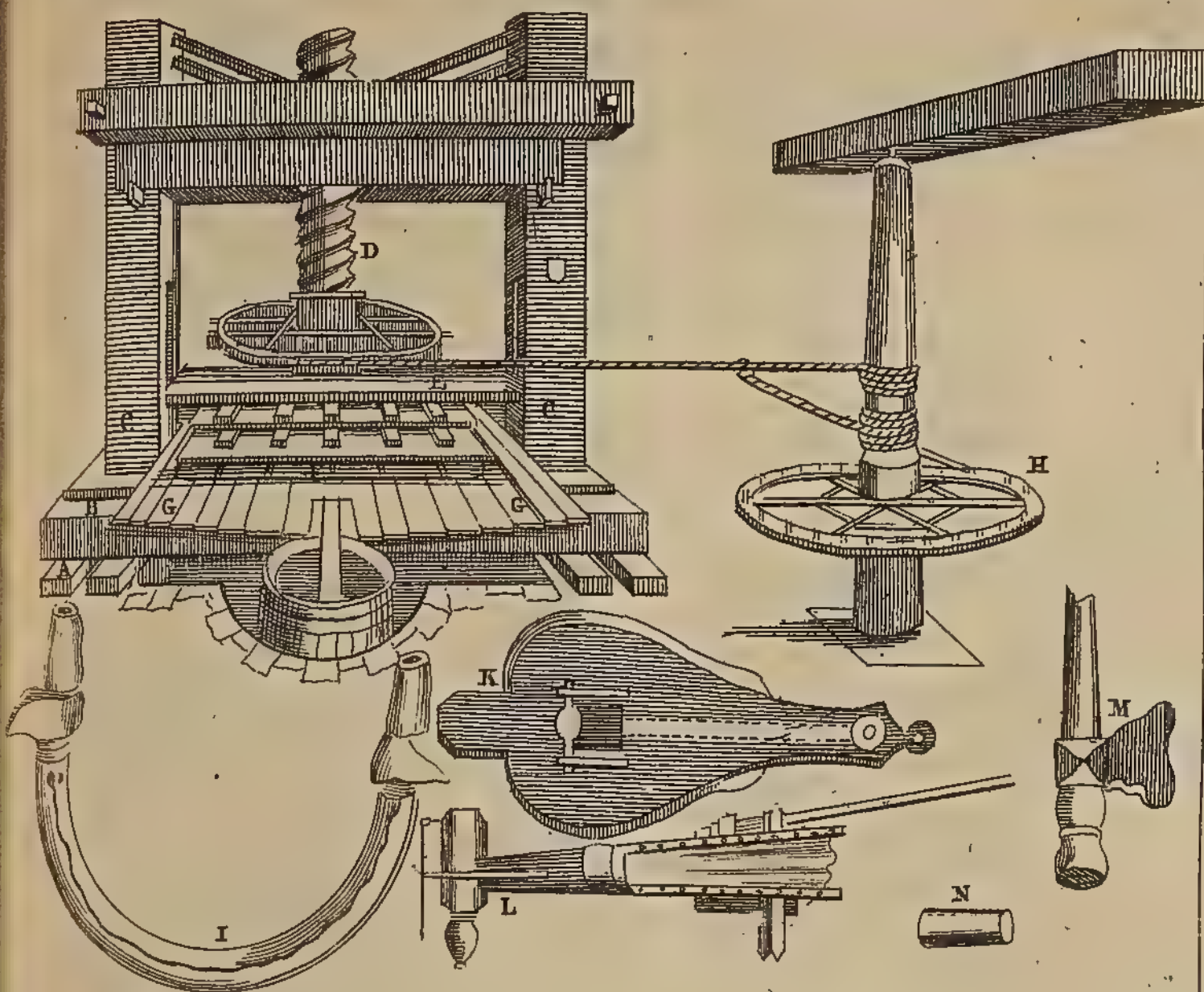


Fig. 2. The great *WINE-PRESS*.

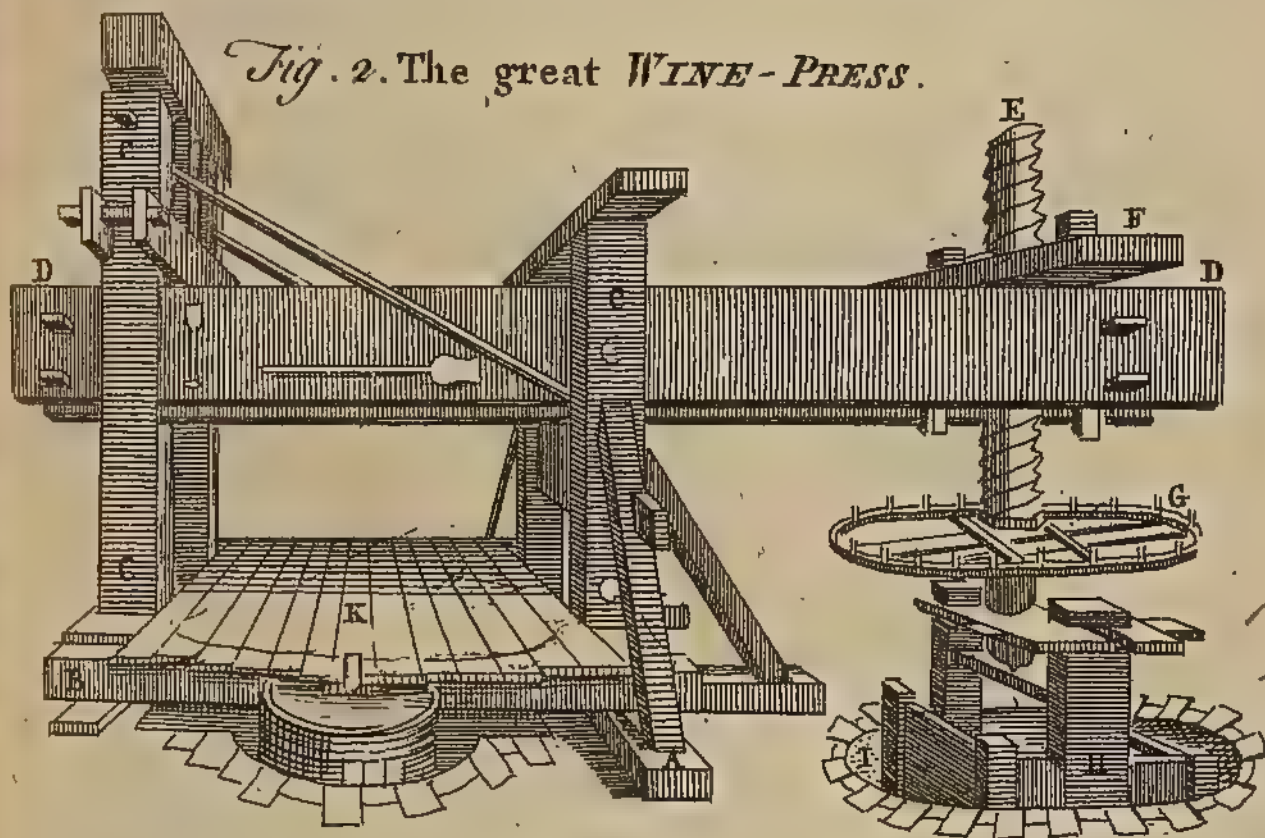


Fig. 3. A *PRESS* to make Verjuice, or to Squeeze Apples

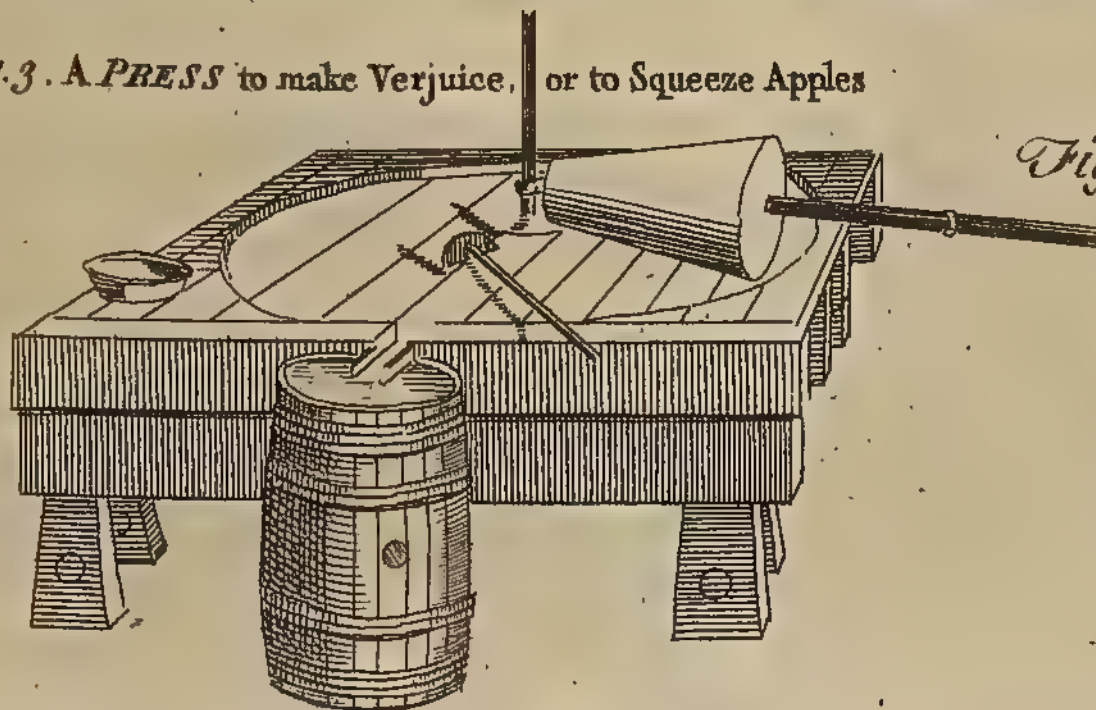


Fig. 4. *PRISM*



the wheel of the screw D, by which means the screw and the bearer E, are pressed down upon the grapes, which are usually covered with cross-beams reared above each other. I is a leather-pipe, terminating in two wooden tubes, for conveying the wine from one piece to another. K is a large bellows to agitate the wine when it has settled into an even surface in both vessels. L the same bellows in profile. M is a large fountain, which affords a quick flow. And N is a stopple to close the vessel newly filled, and prevent the wine from running over, upon withdrawing the wooden tube.

A B (*ibid.* fig. 2.) represents the base and other supports of the great wine-press; C, C, &c. the cheeks, or side-beams; D, D, great beams, two in number at least, and frequently four, or even six; E, the screw; F, the nut of the press; G, the wheel, which, by the help of five or six men, turns the screw; and H, the cage, which is an assemblage of several strong pieces of timber formed into a square, and lined with masonry within. This cage is ten feet long, and four and an half broad on each side, and may be either raised out of, or sunk into the pit of masonry I; from whence it is exhibited as ascending in the figure referred. It usually weighs three thousand pounds; and being suspended in the manner represented, forms, in conjunction with the screw, a lever of an immense force for squeezing down a bearer upon grapes placed upon the maye K, as in the former figure. See the article WINE.

As to cyder-presses, the best and least chargeable, is that called the box-press (*ibid.* fig. 3.) with which you may squeeze apples, pears, grapes, or any other fruit, to make wine, cyder, perry, or verjuice: for as one end of the box terminates in a moveable beam, which is worked by a wheel and a screw in the usual manner; so there are holes in the side of the box, through which the juice flows by a spout into the vessel designed to receive it. See the article CYDER.

The olive-press has been already described under the article OLIVE.

The press used by joiners to keep close the pannels, &c. of wainscot, consists of two screws, and two pieces of wood four or five inches square, and two or three feet long, whereof the holes at the two ends serve for nuts to the screws.

The press used by inlayers, resembles

the joiners-press, only the pieces of wood are thicker, and only one of them moveable; the other, which is in form of a tressel, being sustained by two legs joined into it at each end.

This serves for sawing and cleaving of wood required in marquetry. See the article MARQUETRY.

The founders-press is a strong square frame, consisting of four pieces of wood firmly joined together with tenons, &c. It is of various sizes: two of them are required to each mould, at the two extremes whereof they are placed; so as that, by driving wooden wedges between the mould and sides of the press, the two parts of the mould for the metal may be pressed close together. See FOUNDERY.

The book-binders-press consists of two large wooden cheeks joined by two strong wooden screws; which, being turned by an iron-bar, draw together or set asunder the cheeks at pleasure. See BOOK-BINDING.

The cheeks are placed flat on a wooden stand, in form of a chest, into which the cuttings fall. A-side of the cheeks are two pieces of wood of the same length with the screws, serving to direct the cheeks. Upon the cheeks is the shaft or fust, to which the cutting knife is fastened by a screw which has its key to dismount it on occasion.

The shaft consists of several parts; a wooden screw, which, catching within the nut of the two feet that sustain it, brings the knife to the paper, which is fastened in the press. This screw, which is pretty long, has two directories, which resemble those of the screw of the cheeks. To make the shaft slide square, that foot of the shaft where the knife is not fixed, has a kind of groove directed by a thread fastened along one of the cheeks. Lastly, the knife is a piece of steel six or seven inches long, pointed a-top, and square all the rest.

The press used in the woollen manufactory is a large wooden machine, serving to press cloaths, serges, &c. to render them smooth, and give them a gloss. See plate CCX. fig. 4. where N D is a press with an iron-screw, and K E a press with a wooden screw.

The principal parts of this machine are the cheeks of the press, marked A, A, &c. the nut, in which the box is fixed, marked B, B; the windlas, C; an iron-screw, D; a wooden-screw, E; a female-screw, or box, to receive the male one, F; the bed to lay the fold-

ed stuff on, K; an iron-lantern, L; and a wooden one, M; and N, the stuff in the press.

The press for linnens, silks, &c. is called a calender. See CALENDER.

For the rolling and printing-press, see the article PRINTING.

PRESSING, in the manufactures, is the violently squeezing a cloth, stuff, &c. to render it smooth and glossy.

There are two methods of pressing, *viz.* cold or hot.

As to the former, or cold pressing, after the stuff has been scoured, fulled, and shorn, it is folded square in equal plaits, and a skin of vellum, or pasteboard, put between each plait. Over the whole is laid a square wooden plank, and so put into the press; which is screwed down tight by means of a lever. After it has lain a sufficient time in the press, they take it out, removing the pasteboards, and lay it up to keep.

Some only lay the stuff on a firm table, after plating and pasteboarding, cover the whole with a wooden plank, and load it with a proper weight.

The method of pressing hot is this: When the stuff has received the above preparations, it is sprinkled a little with water, sometimes gum-water, then plaited equally, and between each two plaits are put leaves of pasteboard; and between every sixth or seventh plait, as well as over the whole, an iron or brass-plate well heated in a kind of furnace. This done, it is laid upon the press, and forcibly screwed down.

Under this press are laid five, six, &c. pieces at the same time, all furnished with their pasteboards and iron plates. When the plates are well cold, the stuffs are taken out and stitched a little together to keep them in the plaits.

This manner of pressing was only invented to cover the defects of the stuffs; and, accordingly, it has been frequently prohibited.

PRESSOVIA, a town of Little Poland, situated on the Vistula, twenty miles east of Cracow.

PRESSURE, or **PRESSION**, in general, denotes the squeezing a thing close together. The pressure of fluids has been already explained under the articles FLUID, AIR, &c.

The Cartesians suppose the action of air to consist in a sort of pressure. But Sir Isaac Newton has taught us better; for if light consisted only in a pression, with-

out actual motion, it could not warm such bodies as reflect and refract it; and if it consisted in an instantaneous motion, as such pression supposes, there would be required an infinite force to produce that motion every moment in every lucid particle: hence it must follow, that light would infect itself ad umbram; for pression, in a fluid medium, cannot be propagated in right lines beyond any obstacle which shall hinder any part of the motion; but will infect and diffuse itself every way into those parts of the quiescent medium, which lie beyond the said obstacle. See Newton's *Optics*.

PREST, a duty in money paid by the sheriff upon his account in the exchequer, for money remaining in his hands.

PREST-MONEY, the money given to new-listed soldiers, so called because it binds those who receive it, to be ready at all times.

PRESTATION, signifies the payment of a certain sum by arch-deacons, and other clergymen, annually to their bishop.

PRESTER, in physiology, a meteor consisting of an exhalation, thrown from the clouds downwards with such violence, as by the collision it is set on fire. It differs from the thunder-bolt in the manner of its inflammation, and its burning and breaking every thing it touches with greater vehemence.

PRESTER JOHN, or **JEAN**, an appellation given to the king of Abyssinia, or Ethiopia. See the article ETHIOPIA. This name is altogether unknown in Ethiopia, where he is called the grand Negus.

PRESTIMONY, in the cannon-law, denotes a fund or revenue, appropriated by the founder for the maintenance of a priest; without being erected into any title of benefice, chapel, priory, &c. and which is not subject either to the pope, or to the ordinary; but whereof the patron, and those who have a right from him, are the collators, and nominate and confer, pleno jure. Though others explain it somewhat differently.

PRESTO, in the Italian music, intimates to perform very quick, as *prestissimo* does extremely so.

PRESTON, a borough-town, twenty miles south of Lancaster, which sends two members to parliament.

PRESUMPTION, in law, signifies an opinion or belief of a thing.

There are three kinds of it. 1. Violent presumption, which is frequently taken

as a full proof; as if a person is found killed in a house, and at the same time a man is seen to come out with a bloody sword or knife, and no other person was then in the house; this is a violent presumption, and amounts to a proof that the said man was the murderer. 2. Probable presumption may be of some though but small weight. 3. Light presumption which signifies nothing at all.

Where all the witnesses to a feoffment, or other deed, are dead, continual and quiet possession is a violent presumption: also if a landlord give a receipt for the last year's rent due of a long term, it is presumed in law that all the rest are likewise paid, though the tenant should not be able to produce receipts.

PRESUMPTIVE HEIR, the same with heir at law. See the article **HEIR**.

PRETENCE, or *escutcheon of PRETENCE*, in heraldry. See **ESCUTCHEON**.

PRETENDER; by statute 1 George I. c. 1. the lord treasurer, &c. is impowered to give 100000 pounds as a reward to any one that shall seize and secure his person, whenever he shall land, or attempt it in England, &c.

PRETENSED RIGHT, in law, is where a person is in possession of lands, and another that is not in possession claims and sues for them; in which case, the pretended right is said to be in him who claims and sues for the same.

PRETERIT, *præteritum*, in grammar, a tense which expresses the time past, or an action completely finished; as *scripsi*, I have wrote.

But besides the præterit perfect, as it is called, already explained, there are other two taken notice of by grammarians, viz. the imperfect and plusquamperfect. See the article **IMPERFECT**.

The plusquamperfect, *præteritum plusquam perfectum*, is a tense which respects a past time, and expresses that the action was then completely finished; as *scripseram*, I had written.

The several circumstances of the past time are distinguished in latin, greek, &c. by particular terminations of the verb. But the modern languages, particularly the english, &c. instead of different terminations, have usually recourse to those of their auxiliaries and participles.

PRETERITION, in rhetoric, a figure whereby, in pretending to pass over a thing untouched, we take a summary view of it.

PRETEXT, a colour or motive, whether real or feigned, for doing something.

PRETEXTA, or *TOGA PRÆTEXTA*, among the antient Romans, a long white gown, with a border of purple round the edges, and worn by children of quality till the age of puberty, viz. by the boys till seventeen, when they changed it for the toga virilis; and by the girls, till marriage.

PRETIOUS, or **PRECIOUS**. See the article **PRECIOUS**.

PRETOR, or *PRÆTOR*, a magistrate among the antient Romans, not unlike our lord chief justices, or lord chancellor, or both in one; as being vested with the power of distributing justice among the citizens. At first there was only one pretor; but afterwards another being created, the first or chief one had the title of pretor urbanus, or the city-pretor; the other was called peregrinus, as being judge in all matters relating to foreigners. But, besides these, there were afterwards created many provincial pretors; who were not only judges, but also assisted the consuls in the government of the provinces, and even were invested with the government of provinces themselves.

PRETORIAN GUARDS, *prætoriae cohortes*, in roman antiquity, were the emperor's guards, who at length were increased to ten thousand; they had this denomination, according to some, from their being stationed at a place in the palace called prætorium: their commander was stiled præfectus prætorii. See the article **PREFECT**.

PRETORIUM, *prætorium*, among the Romans, denoted the hall or court wherein the pretor lived, and wherein he administered justice.

It likewise denoted the tent of the roman general, wherein councils of war, &c. were held: also a place in Rome, where the pretorian guards were lodged.

PREVARICATION, *prævaricatio*, in the civil-law, is where the informer colludes with the defendants, and so makes only a sham prosecution.

PREVARICATION, in our laws, is when a man falsely seems to undertake a thing, with intention that he may destroy it; where a lawyer pleads booty, or acts by collusion, &c.

It also denotes a secret abuse committed in the exercise of a public office, or of a commission given by a private person.

PREVARICATOR, *prævaricator*, at Cambridge, is a master of arts, chosen

at a commencement, to make an ingenious satirical speech reflecting on the misdemeanors of the principal members.

PREVENTION, *præventio*, in the canon law, &c. the right which a superior person has to claim, or transact an affair, prior to an inferior one.

PREVESA, a port-town of Albania, or Epirus, situated at the entrance of the gulph of Venice, 25 miles north of the island of Cephalaria: east long. $21^{\circ} 15'$, north lat. $38^{\circ} 45'$.

PRIAMAN, a port-town of the island of Sumatra, and a dutch factory: east long. 98° , south lat. 1° .

PRIAPEIA, in poetry, certain obscene epigrams, and other pieces, on the god Priapus in the greek catalecta.

PRIAPISM, *πριαπισμός*, in medicine, a continual and painful erection of the penis.

PRIAPUS, in medicine, denotes the genital parts in men.

It also denotes, in antiquity, a fabulous deity, particularly adored at Lampascus, the place of his birth, who was revered very much for the extraordinary size of his parts.

PRICKING, in the sea-language, is to make a point on the plat or chart, near about where the ship then is, or is to be at such a time, in order to find the course they are to steer. See **NAVIGATION**.

PRIEST, *sacerdos*, a person set apart for the performing of sacrifice, and other offices of religion.

PRIEST, *presbyter*, in the christian church, is a person invested with holy orders; in virtue whereof he has a power to preach, pray, administer the sacraments, &c. And in the romish church also to bless, absolve, &c. See the article **PRESBYTER**, **ORDINATION**, **CLERGY**, &c.

PRIMÆ VIÆ, among physicians, denote the whole alimentary duct; including the oesophagus, stomach, and intestines, with their appendages. See the articles **ŒSOPHAGUS**, **STOMACH**, and **INTESTINES**.

PRIMAGE, in commerce, a small duty at the water-side, usually about twelve-pence per tun, or six pence a bale, due to the master and mariners of a ship; to the master, for the use of ropes, &c. to discharge the goods; and to the mariners, for the loading or unloading of the vessel. See the article **DUTY**.

PRIMARY-PLANET, in astronomy, one that revolves round the sun as a center. See the article **PLANET**.

PRIMATE, *primas*, in church-polity, an archbishop, who is invested with a jurisdiction over other bishops. See the articles **BISHOP**, **METROPOLITAN**, &c.

Some make a distinction between primate and metropolitan; the former having some sort of preheminance over one or more archbishops, and the latter only over simple bishops: thus the archbishop of Canterbury is styled primate of all England, relating to administrations, &c. which the archbishop of York has only within his own province.

PRIME, *primus*, an appellation given to whatever is first in order, degree, or dignity among several things of the same or like kind; thus, we say, the prime minister, prime cost, &c.

Prime is sometimes used to denote the same with decimal, or the tenth part of an unit. See the article **DECIMAL**.

In weights, it stands for the twenty-fourth part of a grain. See the articles, **WEIGHT** and **GRAIN**.

Prime figure, in geometry, one which cannot be divided into any other figures more simple than itself, as a triangle among planes, and the pyramid among solids. See the article **FIGURE**.

For prime numbers, in arithmetic. See the article **NUMBER**.

Prime of the moon is the new moon, when she first appears, which is about three days after the change. See **MOON**.

Prime vertical is that vertical circle, which passes through the poles of the meridian, or the east and west points of the horizon; whence dials projected on the plane of this circle, are called prime vertical, or north and south dials. See the articles **VERTICAL**, **DIAL**, &c.

Prime, in the romish church, is the first of the canonical hours, succeeding to lauds.

Prime, in fencing, is the first chief of the guards. See the article **GUARD**.

PRIMICERIUS, in antiquity, the first or chief persons in any office or dignity.

PRIMIER SEISIN, in law, *prima seisin*, or first seisin, a branch of the king's prerogative, whereby he had the first possession of all lands and tenements held of him in chief, whereof his tenant died seized in fee; and consequently the rents and profits thereof, till the heir, if of age, did homage; and, if under age, till he became of age. But all charges arising hereby are annulled by stat. 12 Car. II.

PRIMING, or *prime of a gun*, is the gunpowder put into the pan or touch-hole of a piece,

a piece, to give it fire thereby. And this is the last thing done in charging.

For pieces of ordnance, they have a pointed iron-rod, to pierce the cartridge through the touch-hole, called primer or priming-iron.

PRIMING, among painters, signifies the laying on of the first colour.

PRIMIPILUS, PRIMOPILUS, PRIMIRILI *centurio*, in antiquity, the centurion of the first cohort of a legion, who had charge of the roman eagle. See the article CENTURION.

Hence those who had formerly borne the office of primipile, or first centurion of a legion, were called *primipilarii*, *primopilarii*, or *primipilares*; and among other privileges enjoyed by them, most of the soldiers who died in the campaign left them their heirs.

PRIMITIÆ, the first fruits gathered of the earth, whereof the antients made presents to the gods.

In our law, the primitiæ are one year's profits, after avoidance of every spiritual living, as rated in the king's books. See the article ANNATES.

PRIMITIVE, in grammar, is a root or original word in a language, in contradistinction to derivative: thus, *God* is a primitive, *godly* derivative, and *god-like* a compound.

PRIMO *Beneficio ecclesiastico habendo*, in law, a writ directed from the king to the lord-chancellor; appointing him to bestow the benefice that shall first fall in the king's gift, above or under such a value, upon this or that clerk.

PRIMOGENITURE, *primogenitura*, the right of the first born.

This right seems to be an unjust prerogative, and contrary to the natural right; for, since it is birth alone gives children a title to the paternal succession, the chance of primogeniture should not throw any inequality among them.

It was not till the race of Hugh Capet, that the prerogative of succession to the crown was appropriated to the first-born. By the aptient custom of gavel kind, still preserved in some parts of our island, primogeniture is of no account, the paternal estate being equally shared among the sons.

PRIMULA, or PRIMULA VERIS, the COWSLIP, in botany, a genus of the pentandria-monogynia class of plants, the flower of which consists of one funnel-like petal, with a wide expanded limb, divided into five cordated segments; the

fruit is a cylindric capsule, containing numerous roundish seeds. See plate CCVIII, fig. 3.

PRIMUM MOBILE, in the ptolemaic system of astronomy. See MOBILE.

PRIMUM ENS. See the article ENS.

PRIMUS, in anatomy, an appellation given to several muscles, of which there are more than one: thus *primus brachii movens* is the same with the *pectoralis*; the *primus oculus movens*, with *adductor* or *bibitorius*, &c.

PRINCE, *princeps*, in polity, a person invested with the supreme command of a state, independent of any other.

Prince also denotes a person who is a sovereign in his own territories, yet holds of some other as his superior; such are the princes of Germany, who, though absolute in their respective principalities, are bound to the emperor in certain services. Prince also denotes the issue of princes, or those of the royal family. In France, they are called princes of the blood. In England the king's children are called sons and daughters of England: the eldest son is created prince of Wales. The cadets are created dukes or earls as the king pleases. And the title of all the children is royal highness: all subjects are to kneel, when admitted to kiss their hand, and at table, out of the king's presence they are served on the knee. It is high treason to violate the eldest daughter unmarried.

The prince of Wales is born duke of Cornwall, and immediately entitled to all the revenues belonging thereto. He is afterwards created prince of Wales by investiture with a cap, coronet, gold-venge, and ring, and he holds it by patent. The title and principality were first given by Edw. I. to his eldest son. While Normandy remained to England, he was stiled duke of Normandy; but since the union, his title is *Magnæ Britanniae Princeps*. He is reputed, in law, the same person with the king; to imagine his death, or violate his wife, is high treason.

PRINCE of the *senate* in old Rome, the person who was called over first in the roll of senators, whenever it was renewed by the censors: he was always of consular and censorian dignity. See the article SENATE.

PRINCE of the youth, *princeps juventutis*, a title given to the successor nominated by any of the roman emperors in their lifetime.

PRINCE'S

PRINCE'S FEATHER, in botany, the same with amaranth. See **AMARANTH**.

PRINCE'S METAL. See **METAL**.

PRINCIPAL, *principalis*, the chief and most necessary part of a thing.

In commerce, principal is the capital of a sum due or lent, so called in opposition to interest. See the article **INTEREST**.

It also denotes the first fund put by partners into a common stock, by which it is distinguished from the calls or accessions afterwards required.

PRINCIPAL point, in perspective, is a point in the perspective plane, upon which a line drawn from the eye perpendicular to the plane falls. It is in the intersection of the horizontal and vertical plane, and called the point of sight and point of the eye. See **PERSPECTIVE**.

PRINCIPAL-RAY, in perspective, that which passes perpendicularly from the spectator's eye to the perspective plane. See the article **PERSPECTIVE**.

PRINCIPAT, a province of the kingdom of Naples, situated on the Mediterranean between the provinces of Lavoro and Calabria, and divided into the hither and further principat, with respect to the city of Naples.

PRINCIPLE, *principium*, in general, is used for the cause, source, or origin of any thing.

Principles, in physics, are often confounded with elements, or the first and simplest parts whereof natural bodies are compounded, and into which they are again resolvable by the force of fire. See the article **ELEMENT**.

It is impossible to know the virtues of any body, or how mixed bodies of different kinds stand related to the human body, either for the preservation of its functions entire, the restoring them when lost and impaired, or for the total destruction thereof, till we know the principles of which they consist, and likewise the mixture and proportion of such principles in bodies, to which their effects are principally owing. Wherefore having discovered, by various ways, the parts into which a true chemical analysis resolves bodies, we must look upon such simple parts, into which all mixed bodies are capable of being resolved, and of which they seem to be compounded, as the true and genuine principles. The ancients, having observed, that, in analysing all bodies whatever, they obtained a spirit, or mercury, sulphur, salt, wa-

ter, and earth, concluded the number of principles to be five.

If wine, for instance, be distilled in a proper alembic, a burning-water, or spirit, will first arise; next, an insipid water, which they call phlegm, a thick viscid mass alone remaining in the still. This they put into another vessel or retort, which being exposed to a more intense heat, a small portion of phlegm comes over first; then an acid water, which, according to them, is still spirit or mercury; next, a fat oily substance called sulphur. What remains in the retort is burnt to ashes in an open fire. These ashes are thrown into an earthen vessel, with a proper quantity of boiling water, which they impregnate with salt. This water being filtered through cap-paper, and afterwards evaporated, leaves the salt at the bottom. The other part of the ashes, which the water does not take up, is termed dead earth, or caput mortuum.

Of these five substances the chemists have reckoned two to be passive, water and earth; and three active, spirit, sulphur, and salt; and on these last they thought the whole virtue and efficacy of the mixed body depended. In this analysis we may observe, that there is a two-fold spirit; one oily and inflammable, which rises first by a gentle heat, and is termed spirit of wine; another acid and penetrating, like that of vinegar. Besides these, chemists give the name of spirit to other penetrating, volatile, or urinous liquors, obtained from the parts of animals, such as the spirit of urine, hart-horn, blood, and such like substances; but the later chemists have banished these spirits from the number of their principles, as being nothing else but sulphur, or salt dissolved in water. Thus spirit of nitre, and others of that kind, are only acid salts in water; spirit of hart-horn, or urine, alkaline salts; and spirit of wine, or of turpentine, an ethereal attenuated oil.

Some of the moderns deny, likewise, that either sulphur or salt deserve the name of principles, or elements, as not being the most simple substances producible by chemistry. For sulphur when treated with due care, may be resolved into salt, water, and earth, as is evident, by distilling fetid distilled oils several times with quick lime; which, by this treatment yield, in large quantities,

a vola-

a volatile salt dissolved in phlegm, together with a caput mortuum, or earth. Likewise, ethereal oils are only fat-thick oils, like that of olives, attenuated by salts, and dissolved in water, as may be proved by the two following experiments: if oil of olives, or any other of that kind, be mixed with a fermenting liquor, such as a solution of honey in water, the whole will be converted into an inflammable spirit. And if a quart of spirit of wine, diluted with six quarts of common water, be exposed in a cold place to the open air, the volatile salts will fly off, and leave drops of oil swimming on the top, which are, in every respect, equal to oil of olives, or almonds.

Salt has no better title to a principle than sulphur, because it may, by proper management, be at length reduced to earth and water.

Water and earth, in the strictest sense deserve the name of principles. However in the formation of mixed bodies, a third principle must necessarily concur with them; for being unactive, they could never produce any thing, unless set in motion by an active principle, which, according to some, is nothing but fire. We acknowledge therefore, says Geoffroy, three simple substances, or principles, in bodies; one active, which may be termed fire; and two passive, water and earth. From the most simple union of these three, salt arises; and the next to that is sulphur, or oil. See the articles EARTH, WATER, FIRE, SALT, SULPHUR, &c.

PRINCIPLE is also sometimes used in a synonymous sense with axiom or maxim. See the articles AXIOM and MAXIM.

PRINOS, in botany, a genus of the hexandria-monogynia class of plants, with a monopetalous rotated flower, the limb of which is divided into six oval segments: the fruit is a roundish berry, containing six cells, with a single, osseous, obtuse seed in each.

PRINT, the impression taken from a copper-plate. See the article *Rolling press* PRINTING.

A print may be taken off, so as that the out lines and principal strokes may be exactly copied for graving, in the following manner. If the print be not above a year or two old, the paper need only be well moistened with water, as for printing; but if it be more antient, it should be laid to soak all night in wa-

ter, and afterward hung in the air till it becomes dry enough for the press. The paper thus prepared is to be laid with his printed side next the plate, thinly cased over with white wax; and is thus to be communicated to the rolling-press, whereby an impression of the cut will be gained.

Prints, except of India or China, on their being imported, pay a duty of $1\frac{43}{8}$ d. the piece, drawback $1\frac{29}{8}$ d.

PRINTER, a person who composes and takes impressions from moveable characters ranged in order, or front-plates engraven, by means of ink, and a press; or from blocks of wood cut in flowers, &c. and taken off in various colours on calicoes, linens, silks, &c.

The most curious of these arts, and that which deserves the most particular explanation is the first; for to the printers of books are chiefly owing our deliverance from ignorance and error, the progress of learning, the revival of the sciences, and numberless improvements in arts, which without this noble invention would have been either lost to mankind, or confined to the knowledge of a few. The first printers were Guttemberg, Fust, Schoeffer, Mentel, and Koster; and the first who practised this art in England was Fred. Corseilles, who brought it over from Harlem, in the reign of king Henry VI. The great printers famous for the correctness and elegance of their works, were Aldus, and Paulus Manutius; the two Badii; William and Frederic Morel; Oporin; Frobenius; Robert Henry, and Charles Stephens; Gryphius, Turnebus, Torres, Commelin, Plantin, Raphelengius, Vascofan, Bleau, Crispin, and the two Elzevirs; and among these, the learned printers were the Manutii, the Stephenses, the Bodii, Turnebus, Morel, &c. Plantin had the title of architypographus, or arch-printer, given him by the king of Spain in consideration of his printing the polyglot of Antwerp. The printers of Germany, &c. generally cast their own letter, and sell their own books: these are in many places ranked among the members of universities, and entitled to the privilege of students; in England, they are esteemed a part of the company of stationers and booksellers.

See the article BOOKSELLER.

PRINTING, the art of taking impressions from characters or figures moveable, or

or immoveable, on paper, linen, silk, &c. There are three kinds of printing, the one from moveable letters for books; an other from copper-plates for pictures; and the last from blocks, in which the representation of birds, flowers, &c. are cut for printing calicoes, linens, &c. the first, called common press-printing, the second rolling press-printing, and the last calicoe, &c. printing. The principal difference between the three consists in this, that the first is cast in relievo in distinct pieces, the second engraven in creux, and the third cut in relievo, and generally stamped, by placing the block upon the materials to be printed, and striking upon the back of it.

Progress of PRINTING. Who the first inventors of the european method of printing books were, in what city and what year it was set on foot, are questions long disputed among the learned. In effect, as the grecian cities contended for the birth of Homer, so do the german cities for that of printing. Mentz, Haerlem, and Strasburg, are the warmest on this point of honour, and these are left in possession of the question, which is not yet decided: though it must be owned that Mentz has always had the majority of voices. John Guttenburg, and John Fust of Mentz; John Mentel of Strasburg, and L. John Koster of Haerlem, are the persons to whom this honour is severally ascribed, by their respective countrymen; and they have all their advocates among the learned. However, their first essays were made on wooden blocks, after the chinese manner. The book at Haerlem, the vocabulary called Catholicon, and the pieces in the Bodleian library, and that of Bennet-college, are all performed in this way; and the impression appears to have been only given on one side of the leaves; after which the two blank sides were pasted together. But they soon found the inconveniencies of this method, and therefore bethought themselves of an improvement; which was by making single letters distinct from one another, and these being first done in wood, gave room for a second improvement, which was the making them of metal; and, in order to that, forming moulds, matrices, &c. for casting them. See LETTER.

From this ingenious contrivance we ought to date the origin of the present art of printing, contradistinguished from the method practised by the Chinese. And

of this Schoeffer, or Scheffer, first servant, and afterwards partner and son-in-law of Fust, at Mentz, above-mentioned, is pretty generally allowed to be the inventor: so that he may properly be reckoned the first printer, and the Bible, which was printed with moveable letters in 1450, the first printed book; the next was Augustine de civitate dei, then Tully's Offices, printed about the year 1461. In these books they left the places of the initial letters blank, and gave them to the illuminers to have them ornamented and painted in gold and azure, in order to render the work more beautiful, and, as some think, to make their books pass for manuscripts. Thus at present, in some curious works, the initial letter at the beginning of a book, or chapter, is sometimes left out, and a space is left for its being afterwards printed with various ornaments from a copper-plate.

Some authors tell us, that Fust carrying a parcel of Bibles with him to Paris, and offering them to sale as manuscripts; the French, upon considering the number of books, and their exact conformity to each other, even to a point, and that it was impossible for the best book-writers to be so exact, concluded there was witchcraft in the case, and, by their actually indicting him as a conjurer, or threatening to do so, extorted from him the secret: and hence the origin of the popular story of Dr. Faustus.

From Mentz, the art of printing soon spread itself throughout a good part of Europe; Haerlem and Strasburg had it very early; which as the current of authors represent it, occasioned their pretending to the honour of the invention. From Haerlem it passed to Rome in 1467, and into England in 1468, by means of Tho. Bouchier, archbishop of Canterbury, who sent W. Turner, master of the robes, and W. Caxton, merchant, to Haerlem to learn the art. These privately prevailing with Corseilles, an under-workman, to come over, a press was set up at Oxford, and an edition of Ruffinus on the creed was printed the same year in octavo. From Oxford, Caxton brought it to London about the year 1470, and the same year it was carried to Paris. Hitherto there had been nothing printed but in latin, and the vulgar tongues; and this first in roman characters, then in gothic, and at last in italic: but in 1480, the Italians cast a

set of greek types, and they have also the honour of the first Hebrew editions which were printed about the same time with the greek. Towards the end of the sixteenth century there appeared various editions of books in syriac, arabic, persian, armenian, coptic or egyptian characters, some to gratify the curiosity of the learned, and others for the use of the christians of the Levant. Out of Europe, the art of printing has been carried into the three other parts of the world: for Asia, we see impressions of books at Goa, and in the Philippines; at Morocco, for Africa; at Mexico, Lima, Philadelphia, New York, Boston, &c. for America. The Turks, indeed, rigorously prohibit printing throughout their empire, as imagining that the too frequent communication with books might occasion some change in their religion and government; yet the Jews have several editions of their books printed at Thessalonica, and even at Constantinople.

Method of PRINTING. The printing-letters or types, as they are sometimes called, we have already taken notice of, and have described the method of forming and casting them under the articles *LETTER* and *Letter-FOUNDRY*.

The workmen employed in the art of printing are of two kinds; compositors, who range and dispose the letters into words, lines, pages, &c. according to the copy delivered them by the author; and pressmen, who apply ink upon the same, and take off the impression. The types being cast, the compositor distributes each kind by itself among the divisions of two wooden frames, an upper and an under one, called cases; each of which is divided into little cells or boxes. Those of the upper case are in number ninety-eight; these are all of the same size, and in them are disposed the capitals, small-capitals, accented letters, figures, &c. the capitals being placed in alphabetical order. In the cells of the lower case, which are fifty-four, are placed the small letters with the points, spaces, &c. The boxes are here of different sizes, the largest being for the letters most used; and these boxes are not in alphabetical order, but the cells which contain the letter oftenest wanted, are nearest the compositor's hand. Each case is placed a little aslope, that the compositor may the more easily reach the upper boxes. The instrument in which the letters are set is called *composing-*

stick, see plate CCX. fig. 3. n^o 2. which consists of a long and narrow plate of brass or iron, &c. *cc*, on the right-side of which arises a ledge *bb*, which runs the whole length of the plate, and serves to sustain the letters, the sides of which are to rest against it: along this ledge is a row of holes, which serve for introducing the screw *f*, in order to lengthen or shorten the extent of the line, by moving the sliders *e*, *d*, farther from, or nearer to the shorter ledge at the end *a*. Where marginal notes are required in a work, the two sliding-pieces, *e*, *d*, are opened to a proper distance from each other; in such a manner as that while the distance between *d* and *e* forms the length of the line in the text, the distance between the two sliding-pieces forms the length of the lines for the notes on the side of the page. Before the compositor proceeds to compose, he puts a rule, or thin slip of brass-plate, cut to the length of the line, and of the same height as the letter, in the composing-stick, against the ledge, for the letter to bear against. Things thus prepared, the compositor having the copy lying before him, and his stick in his left-hand, his thumb being over the slider *d*; with the right, he takes up the letters, spaces, &c. one by one, and places them against the rule, while he supports them with his left thumb by pressing them to the end of the slider *d*; the other hand being constantly employed in setting in other letters: the whole being performed with a degree of expedition and address not easy to be imagined.

A line being thus composed, if it end with a word or syllable, and exactly fill the measure, there needs no further care; otherwise more spaces are to be put in, or else the distances lessened between the several words, in order to make the measure quite full; so that every line may end even. The spaces here used are pieces of metal exactly shaped like the shanks of the letters; these are of various thicknesses, and serve to support the letters, and to preserve a proper distance between the words; but not reaching so high as the letters, they make no impression when the work is printed. The first line being thus finished, the compositor proceeds to the next; in order to which he moves the brass-rule from behind the former, and places it before it, and thus composes another line against it after the same manner as before: going

going on thus till his stick is full, when he empties all the lines contained in it into the gally. See the article GALLY. The compositor then fills and empties his composing-stick, as before, till a complete page be formed, when he ties it up with a cord or pack-thread, and setting it by, proceeds to the next, till the number of pages to be contained in a sheet is completed: which done, he carries them to the imposing-stone, there to be ranged in order, and fastened together in a frame called a chase, and this is termed imposing. The chase is a rectangular iron-frame, of different dimensions, according to the size of the paper to be printed, having two cross pieces of the same metal, called a long and short cross, mortised at each end so as to be taken out occasionally. By the different situation of these crosses the chase is fitted for different volumes: for quartos and octavos, one traverses the middle lengthwise, the other broadwise, so as to intersect each other in the center: for twelves and twenty-fours, the short cross is shifted nearer to one end of the chase: for folios, the long cross is left entirely out, and the short one left in the middle; and for broad-sides, both crosses are set aside. To dress the chase, or range and fix the pages therein, the compositor makes use of a set of furniture, consisting of slips of wood of different dimensions, and about half an inch high, that they may be lower than the letters: some of these are placed at the top of the pages, and called head-sticks; others between them to form the inner margin; others on the sides of the crosses to form the outer margin, where the paper is to be doubled; and others in the form of wedges to the sides and bottom of the pages. Thus all the pages being placed at their proper distances, and secured from being injured by the chase and furniture placed about them, they are all untied, and fastened together by driving small pieces of wood called quoins, cut in the wedge-form, up between the slanting side of the foot and side-sticks and the chase, by means of a piece of hard wood and a mallet, and all being thus bound fast together, so that none of the letters will fall out, it is ready to be committed to the pressman. In this condition the work is called a form; and as there are two of these forms required for every sheet, when both sides are to be printed, it is necessary the distances between the

pages in each form should be placed with such exactness, that the impression of the pages in one form shall fall exactly on the back of the pages of the other, which is called register.

As it is impossible but that there must be some mistakes in the work, either through the oversight of the compositor, or by the casual transposition of letters in the cases; a sheet is printed off, which is called a proof, and given to the corrector; who reading it over, and rectifying it by the copy, by making the alterations in the margin, it is delivered back to the compositor to be corrected. For the characters used in correcting a sheet for the compositor, see CORRECTION.

The compositor then unlocking the form upon the correcting-stone, by loosening the quoins or wedges which bound the letters together, rectifies the mistakes by picking out the faulty or wrong letters with a slender sharp-pointed steel-bodkin, and puts others into their places; but when there are considerable alterations, and particularly where insertions or omissions are to be made, he is under a necessity of over-running. Thus, if one or more words to be inserted in a line cannot be got in, by changing the spaces of a line for lesser ones, part of the line must be put back into the close of the preceding one, or forward into the beginning of the subsequent one, and this continued till the words are got in. After this another proof is made, sent to the author, and corrected as before; and, lastly, there is another proof, called a revise, which is made in order to see whether all the mistakes marked in the last proof are corrected.

The pressman's business is to work off the forms thus prepared and corrected by the compositor; in doing which there are four things required, paper, ink, balls, and a press. To prepare the paper for use, it is to be first wetted by dipping several sheets together in water: these are afterwards laid in a heap over each other; and to make them take the water equally, they are all pressed close down with a weight at the top. The ink is made of oil and lamp-black, for the manner of preparing which, see *Printing-INK*. The balls by which the ink is applied on the forms, are a kind of wooden funnels with handles, the cavities of which are filled with wool or hair, as is also a piece of alum-leather or pelt nailed over the cavity, and made extremely soft by soaking

Fig. 2. A Cheese-PRESS.

Fig. 1. POWER.

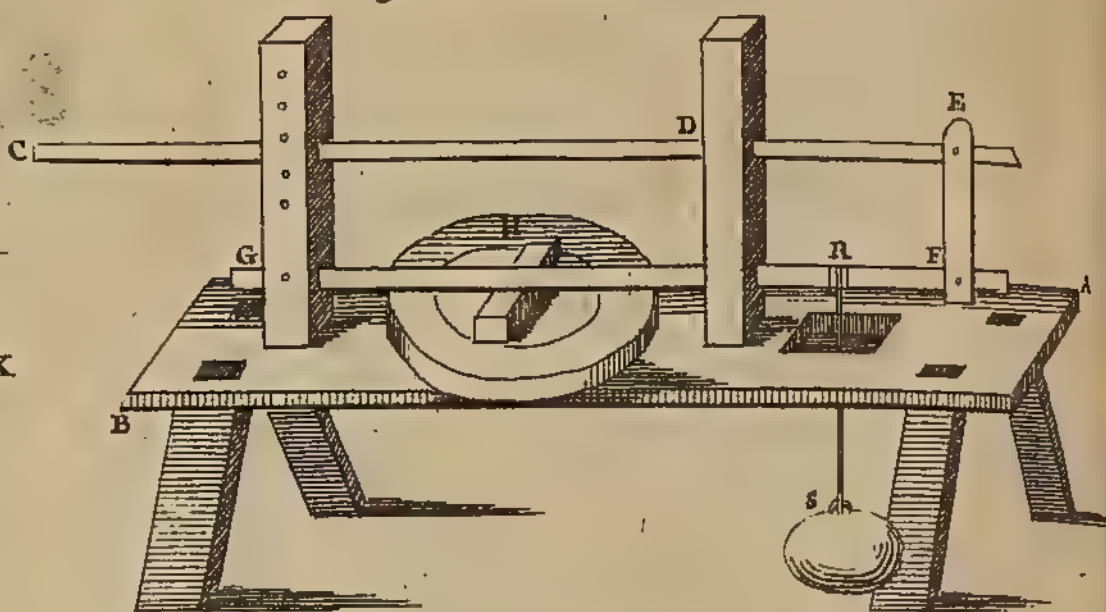
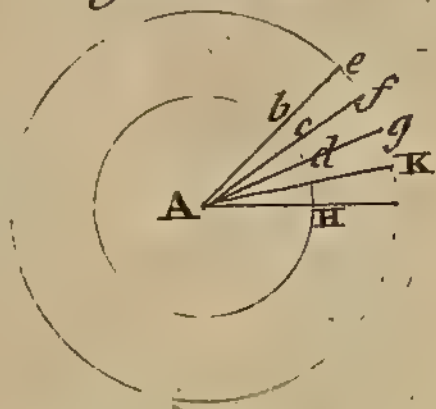


Fig. 3. PRINTING-PRESS.

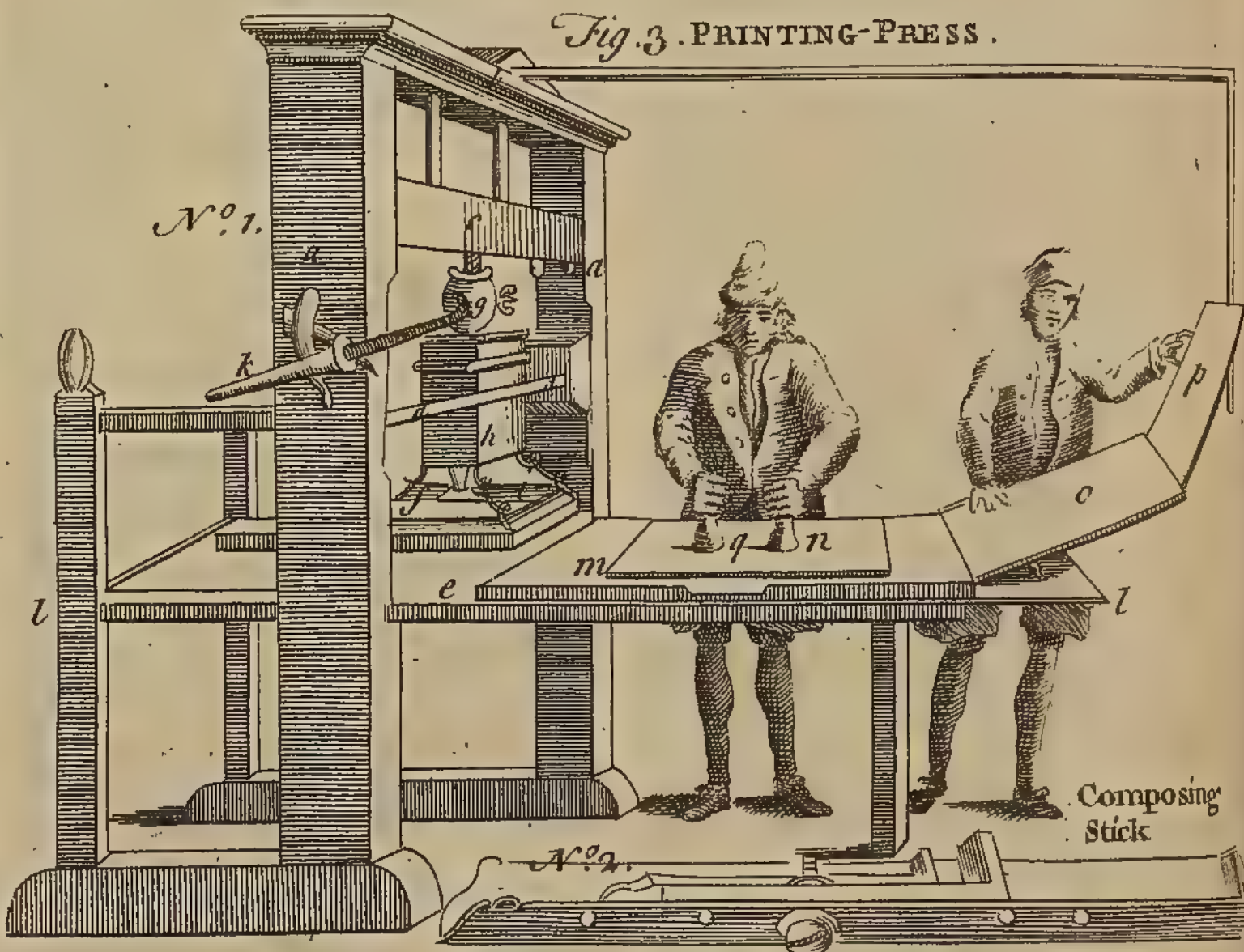
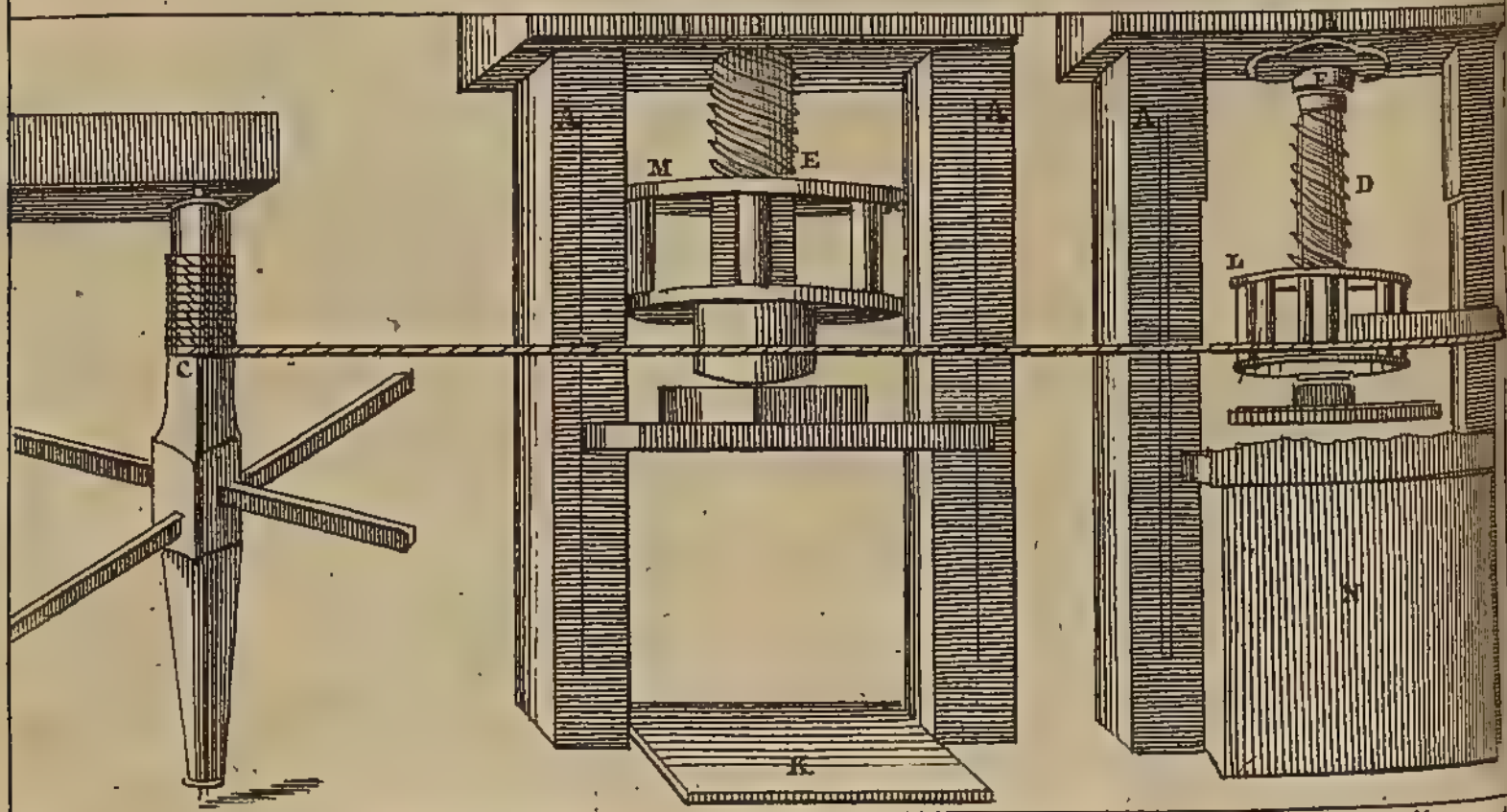


Fig. 4 The Clothiers-PRESS.



soaking in urine, and by being well rubbed. One of these the pressman takes in each hand, and applying one of them to the ink-block, dabs and works them together to distribute the ink equally, and then blackens the form which is placed on the press, by beating with the balls upon the face of the letter.

The printing-press represented in plate CCX. fig. 3. n° 1. is a very curious though complex machine; the body consists of two strong cheeks *a a*, placed perpendicularly, and joined together by four cross-pieces; the cap *b*; the head *c*, which is moveable, being partly sustained by two iron-pins, or long bolts, that pass the cap; the shelves *d d*, which serve to keep steady a part called the hose, and the winter *e*, which bears the carriage, and sustains the effort of the press beneath. The spindle *f* is an upright piece of iron pointed with steel, having a male-screw which goes into the female one in the head about four inches. Through the eye *g* of this spindle is fastened the bar *k*, by which the pressman makes the impression. Part of the spindle is inclosed in a square wooden frame called the hose, *h*, and its point works into a brass-pan supplied with oil, which is fixed to an iron-plate let into the top of the platten. At each corner of the hose, there is an iron-hook fastened with pack-thread to those at each end of the platten *i*, in such a manner as to keep it perfectly level. The carriage *l l* is placed a foot below the platten, having its fore-part supported by a prop called the fore-stay, while the other rests on the winter. On this carriage, which sustains the plank, are nailed two long iron-bars or ribs, and on the plank are nailed short pieces of iron or steel called cramp-irons, equally tempered with the ribs, and which slide upon them when the plank is turned in or out. Under the carriage is fixed a long piece of iron called the spit, with a double wheel in the middle, round which leather girts are fastened, nailed to each end of the plank; and to the outside of the spit is fixed a rounce *m*, or handle to turn round the wheel. Upon the plank is a square frame or coffin, in which is inclosed a polished stone on which the form *n* is laid; at the end of the coffin are three frames, *viz.* the two tympan and frisket: the tympan *o* are square, and made of three slips of very thin wood, and at the top a piece of iron still thinner; that called

the outer tympan fastened with hinges to the coffin: they are both covered with parchment; and between the two are placed blankets, which are necessary to take off the impression of the letters upon the paper. The frisket *p* is a square frame of thin iron, fastened with hinges to the tympan; it is covered with paper cut in the necessary places, that the sheet, which is put between the frisket and the great or outward tympan, may receive the ink, and that nothing may hurt the margins. To regulate the margins, a sheet of paper is fastened upon this tympan, which is called the tympan-sheet, and on each side is fixed an iron-point, which makes two holes in the sheet, which is to be placed on the same points, when the impression is to be made on the other side. In preparing the press for working, the parchment which covers the outer tympan is wetted till it is very soft, in order to render the impression more equable; the blankets are then put in, and secured from slipping by the inner tympan; then while one pressman is beating the letter with the balls *q*, covered with ink taken from the ink-block: the other person places a sheet of white paper on the tympan-sheet, turns down the frisket upon it to keep the paper clean and prevent its slipping; then bringing the tympan upon the form, and turning the rounce, he brings the form with the stone, &c. weighing about 300 pounds weight, under the platten; pulls with the bar, by which means the platten presses the blankets and paper close upon the letter, whereby half the form is printed; then easing the bar, he draws the form still forward, gives a second pull, and letting go the bar, turns back the form, takes up the tympan and frisket, takes out the printed sheet and lays on a fresh one; and this is repeated till he has taken off the impression upon the full number of sheets the edition is to consist of. One side of the sheet being thus printed, the form for the other is laid upon the press, and worked off in the same manner.

Chinese PRINTING is performed from wooden planks or blocks, cut like those used in printing of callico, paper, cards, &c. for the use of which, see the article LETTER.

This kind of printing is generally allowed to be of very great antiquity. Their blocks are made of smooth, close wood, of the size of the leaf required, and the copy being fairly wrote on chi-

nese paper, is struck with the writing downwards on the smooth side of the wood, and then given to the sculptor, or cutter in wood; who cuts out all that is to remain white, and leaves only the lines of the writing, which when the work is finished remain in relievo, after which they rub off all remains of the paper. This is smeared over with chinese or indian-ink mixed with water, which is the same they use in writing, and the paper being laid upon the block is pressed close to it, and the impression taken off by rolling over it a wooden cylinder with a handle at each end, and is rendered soft, and proper to give the impression, by its being covered with a piece of soft cotton stuff rolled round it.

Rolling-press-PRINTING is employed in taking off prints or impressions from copper plates engraven, etched, or scraped as in mezzotintos. See ENGRAVING *on copper*, ETCHING, and MEZZOTINTO. This art is said to have been as antient as the year 1540, and to owe its origin to Finiguerra, a florentine goldsmith, who pouring some melted brimstone on an engraven plate, found the exact impression of the engraving left in the cold brimstone, marked with black taken out of the strokes by the liquid sulphur: upon this he attempted to do the same on silver-plates with wet paper, by rolling it smoothly with a roller; and this succeeded: but this art was not used in England till the reign of king James I. when it was brought from Antwerp by Speed. The form of the rolling-press, the composition of the ink used therein, and the manner of applying both in taking off prints, are as follow.

The rolling-press A L (plate CCXI. fig. 1.) may be divided into two parts, the body and carriage: the body consists of two wooden cheeks, P, P, placed perpendicularly on a stand or foot, L M, which sustains the whole press. From the foot likewise arise four other perpendicular pieces c, c, c, c, joined by other cross or horizontal ones, d, d, d, which serve to sustain a smooth even plank or table H I K, about four feet and a half long, two feet and a half broad, and an inch and a half thick. Into the cheeks go two wooden cylinders or rollers, D E, F G, about six inches in diameter, borne up at each end by the cheeks, whose ends, which are lessened to about two inches diameter, and called trunnions, turn in the cheeks about two pieces of

wood in form of half-moons, lined with polished iron to facilitate the motion. Lastly, to one of the trunnions of the upper roller is fastened a cross, consisting of two levers, A, B, or pieces of wood, traversing each other, the arms of which cross serve instead of the bar or handle of the letter-press, by turning the upper roller, and when the plank is between the two rollers, giving the same motion to the under one, by drawing the plank forward and backward.

The ink used for copper plates, is a composition made of the stones of peaches and apricots, the bones of sheep, and ivory, all well burnt, and called Frankfort-black, mixt with nut-oil that has been well boiled, and ground together on a marble, after the same manner as painters do their colours.

The method of printing from copper-plates is as follows: they take a small quantity of this ink on a rubber made of linen-rags, strongly bound about each other, and therewith smear the whole face of the plate as it lies on a grate over a charcoal-fire. The plate being sufficiently inked, they first wipe it over with a foul rag, then with the palm of the left hand, and then with that of the right; and to dry the hand and forward the wiping, they rub it from time to time on whiting. In wiping the plate perfectly clean, yet without taking the ink out of the engraving, the address of the workman consists. The plate thus prepared, is laid on the plank of the press; over the plate is laid the paper, first well moistened, to receive the impression, and over the paper two or three folds of flannel. Things thus disposed, the arms of the cross are pulled, and by that means, the plate with its furniture, passed through between the rollers, which pinching very strongly, yet equally, presses the moistened paper into the strokes of the engraving, whence it licks out the ink.

PRIOR, in general, something before or nearer the beginning than another, to which it is compared.

PRIOR, more particularly, denotes the superior of a convent of monks, or the next under the abbot. See **ABBOT**.

Priors are either claustral or conventual. Conventual priors are the same as abbots. Claustral prior is he who governs the religious of an abbey or priory in commendam, having his jurisdiction wholly from the abbot.

Grand PRIOR, is the superior of a large abbey,

Fig. 1. ROLLING-PRESS .

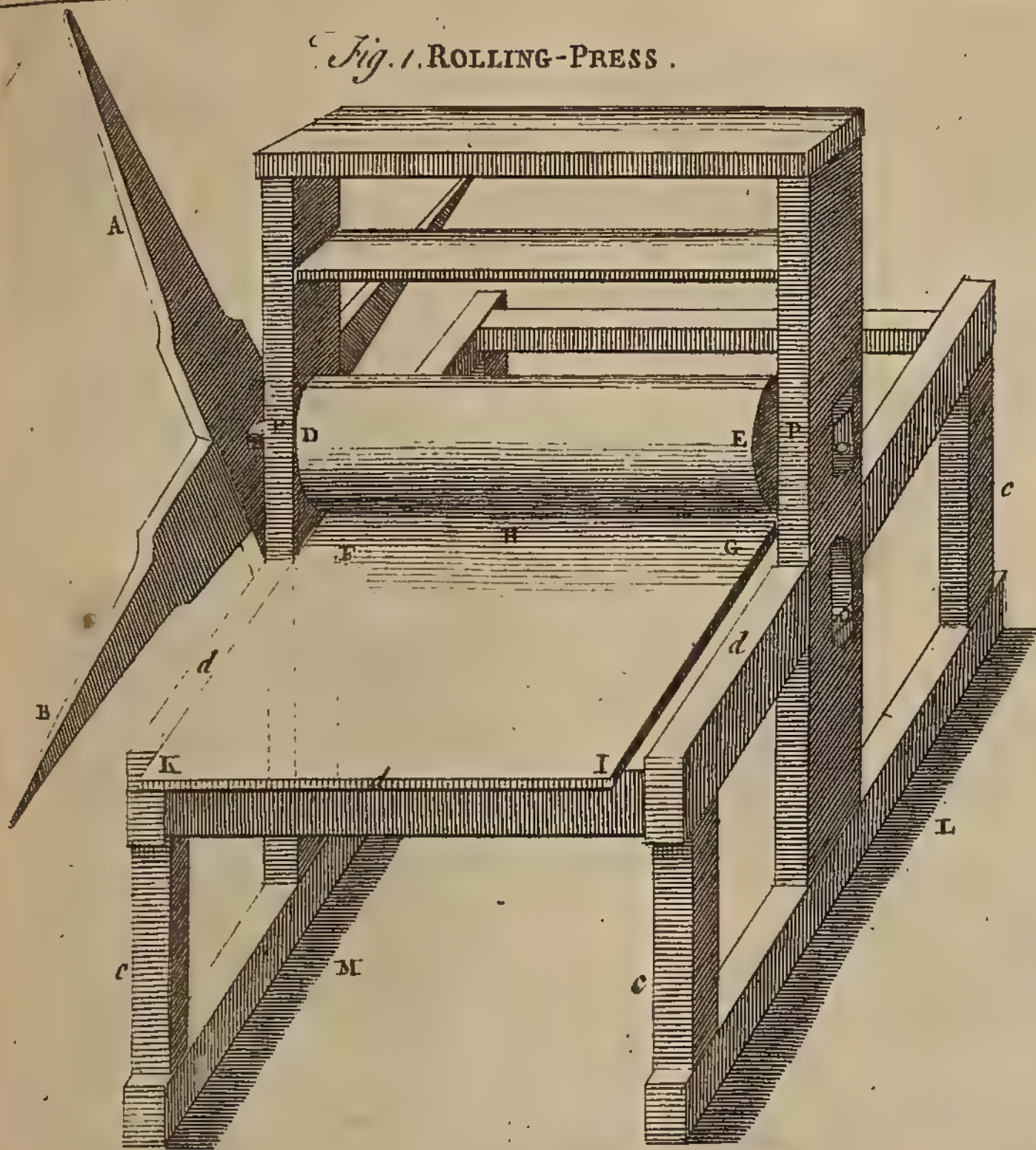


Fig. 2. POINCIANA.

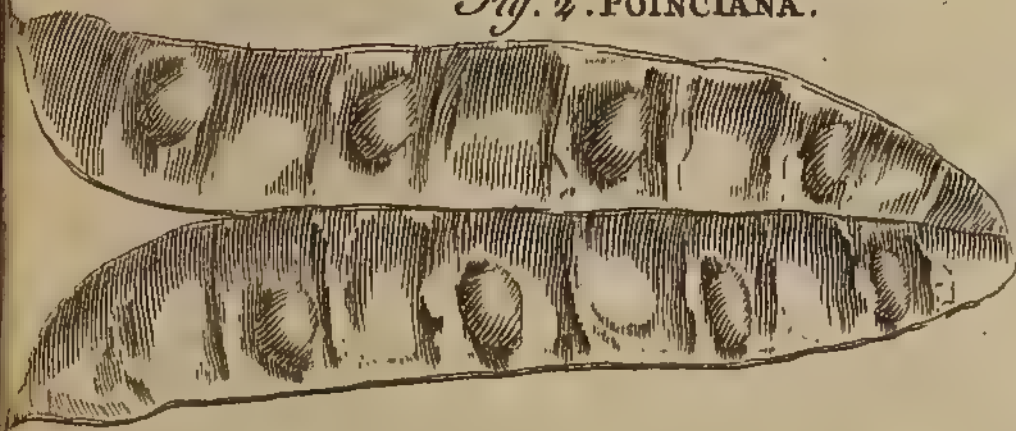
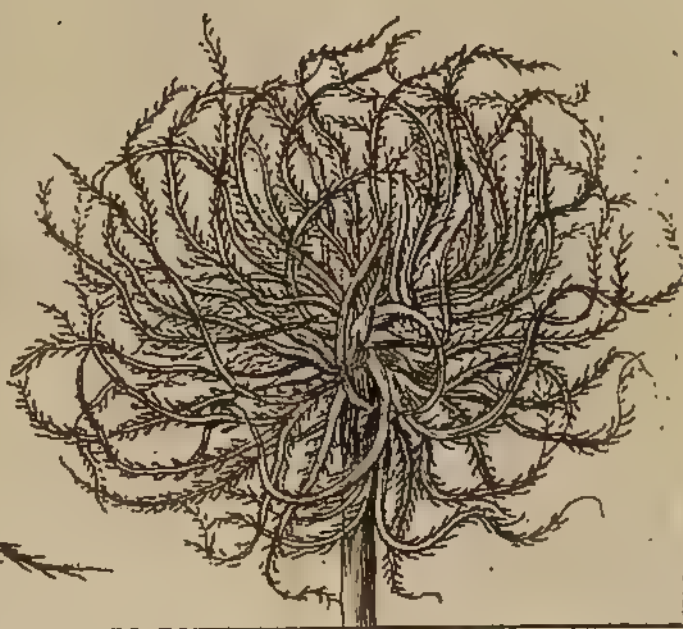
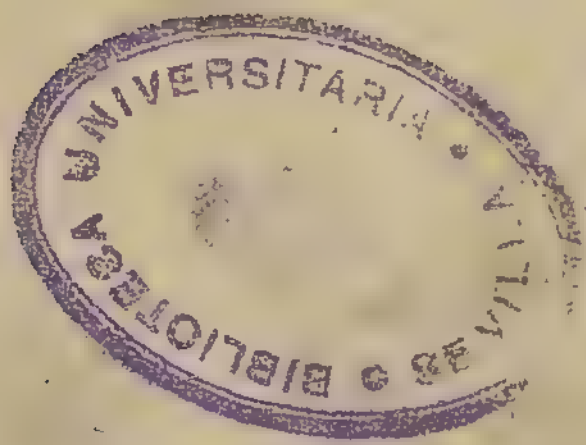


Fig. 3. PULSATILLA .



J. Jefferys sculp



abbey, where several superiors are required.

PRIORITY, *prioritas*, the relation of something considered as prior to another. The principal modes of priority are five, in respect of time, nature, order, dignity, and causality, as summed up in this distich :

Tempore, natura, prius ordine, dic & honore
Effecto causam dicimus esse prius.

PRIORITY, in law, denotes an antiquity of tenure, in comparison of another less antient.

Where a prior suit is depending, it may be pleaded in abatement of a subsequent action; and a prior mortgage ought to be first paid off: but it is held, there is no priority of trial in judgments; for that which is first executed shall be first satisfied.

PRISAGE, *prisagium*, that part or share which belongs to the king, or admiral, out of prizes taken at sea from an enemy: this is usually a tenth part. See the article **PRIZE**.

PRISAGE of wines, a term antiently used for what is now called butlerage. See the article **BUTLERAGE**.

PRISCILLIANISTS, in church history, christian heretics, so called from their leader Priscillian, a Spaniard by birth, and bishop of Avila. He is said to have practised magic, and to have maintained the principal errors of the manichees; but his peculiar tenet was, that it is lawful to make false oaths, in order to support one's cause and interests.

PRISE, or PRIZE. See **PRIZE**.

PRISM, in geometry, an oblong solid, contained under more than four planes whose bases are equal, parallel, and alike situated.

The prism is generated by the motion of a rectilinear figure, as A B C, (plate CCIX. fig. 4.) descending always parallel to itself, along the right line A E.

If the describent be a triangle, the body is said to be a triangular prism; if square, a quadrangular one, &c.

From the genesis of the prism, it is evident it has two equal and opposite bases A B C and E D F; and it is terminated by as many parallelograms as the base consists of sides; and that all the sections of a prism parallel to its base are equal. Every triangular prism may be divided into three equal pyramids.

To measure the surface of any prism, find the area of each side, whether a triangle, parallelogram, or other rectilinear figure, as directed under these articles, and the sum of all these, taken together, is the whole superficies of the prism.

The solid content of a given prism may be found thus: let the area of the base of the prism be measured, as directed under the article **TRIANGLE**; and let this area be multiplied by the height of the prism, and the product will give the solid content of the prism.

PRISM, in dioptrics, a triangular glass-prism, much used in experiments about the nature of light and colours. See the articles **LIGHT** and **COLOUR**.

PRISMOID, *prismoides*, in geometry, a solid figure bounded by several planes, whose bases are right-angled parallelograms, parallel, and alike situated.

PRISON, a gaol, or place of confinement. See the article **GAOL**.

Lord Coke observes, that a prison is only a place of safe-custody, *salva custodia*, not a place of punishment. Any place where a person is confined may be said to be a prison: and when a process is issued against one, he must, when arrested thereon, either be committed to prison, or be bound in a recognizance with sureties, or else give bail, according to the nature of the case, to appear at a certain day in court, there to make answer to what is alledged against him. Where a person is taken and sent to prison, in a civil case, he may be released by the plaintiff in the suit; but if it be for treason, or felony, he may not regularly be discharged until he is indicted of the fact and acquitted. See the article **INDICTMENT**, and the next article.

PRISONER, a person restrained or kept in prison upon an action civil or criminal, or upon commandment: and one may be a prisoner on matter of record or matter of fact. A prisoner upon matter of record, is he who being present in court, is by the court committed to prison; and the other is one carried to prison upon an arrest, whether it be by the sheriff, constable, or other officer.

It is held, that the court of king's bench has authority to send for a prisoner out of the Marshalsea prison by rule of court; but it cannot send for a prisoner out of any other prison without a writ of habeas corpus. Each judge of the king's bench may remit prisoners, together with their

their indictments, to the places where the offences with which they are charged were committed; and likewise a prisoner for debt may be removed from the Fleet-prison to the King's-bench, and thence to the Marshalsea, on something charged against him in the habeas corpus or return, or on bringing the person into court.

Prisoners in the king's-bench and Fleet-prisons, on mesne process, &c. are actually to be confined within these prisons, or the rules of the same, till they are discharged: and in case they are not so confined, the profits of the marshals and wardens will be liable to sequestration for the payment of a debt on judgment upon an escape, besides the common remedy.

For the ease of prisoners it is ordered, that those in the King's-bench shall not pay above two shillings and six pence per week chamber-rent: and likewise, whilst any prisoner is kept in close custody, the gaoler, or keeper, is obliged to give him sustenance, and not suffer any one to die for want. Also, by stat. 11 Geo. II. c. 20, it is enacted, that justices of peace, in their sessions, may rate every parish in their county, not exceeding a small weekly sum, to be annually paid towards the relief of poor prisoners. There are also frequent acts of grace for setting at liberty insolvent debtors.

PRISTINA, a town of european Turkey, in the province of Servia, seventy miles north-east of Ragusa: east long. 20°, north lat. 43° 15'.

PRISTIS, the SAW-FISH. See the article SAW-FISH.

PRIVATEERS, in maritime affairs, a kind of private ships of war, fitted out by private persons at their own expence; who have leave granted them to keep what they can take from the enemy, allowing the admiral his share. See the article LETTER of Marque.

Privateers must give bond not to break treaties subsisting with the crown, not to use their captives ill, not to commit any spoil or depredation on the ships of friends or neutrals, &c. and not to bring away any servants, &c. from America, without leave.

PRIVATION, in general, denotes the absence or want of something; in which sense, darkness is only a privation of light. See the article LIGHT.

PRIVATION, or rather DEPRIVATION,

in the canon-law. See the article DEPRIVATION.

PRIVATIVE, in grammar, a particle which, when prefixed to a word, changes it into a contrary sense.

Among the Greeks the α is used as a privative, and among the Latins, *in*. The English, French, &c. borrow both the greek and latin privatives.

PRIVATIVE QUANTITY, or **NEGATIVE QUANTITY**, in algebra, denotes a quantity less than nothing, in opposition to affirmative or positive; and is expressed by the sign (—) minus, prefixed thereto. See the article QUANTITY.

PRIVET, *ligustrum*, in botany. See the article LIGUSTRUM.

PRIVILEGE, in law, some peculiar benefit granted to certain persons or places, contrary to the usual course of the law. Privileges are said to be personal or real. Personal privileges are such as are extended to peers, ambassadors, members of parliament and of the convocation, and their menial servants, &c. See the article PEER, EMBASSADOR, PARLIAMENT, &c.

A real privilege is that granted to some particular place; as the king's palace, the courts at Westminster, the universities, &c. See PALACE, COURT, UNIVERSITY, &c.

PRIVY, in law, denotes one who is partaker, or has an interest in an affair.

Coke mentions four privies; privies in blood, as the heir to his father; privies in representation, as executors and administrators to the deceased; privies in estate, as he in reversion and he in remainder; donor and donee, lessor and lessee; lastly, privy in tenure, as the lord by escheat.

PRIVY-COUNCIL. See the article Privy-COUNCIL.

PRIVY-SEAL. See the article SEAL.

PRIZE, or **PRISE**, in maritime affairs, a vessel taken at sea from the enemies of a state, or from pirates; and that either by a man of war, a privateer, &c. having a commission for that purpose.

Vessels are looked on as prize, if they fight under any other standard than that of the state from which they have their commission; if they have no charter-party, invoice, or bill of lading a-board; if loaded with effects belonging to the king's enemies, or with contraband goods.

Those of the king's subjects recovered from

from the enemy, after remaining twenty-four hours in their hands, are deemed lawful prize.

Vessels that refuse to strike, may be constrained; and if they make resistance and fight, become lawful prize, if taken.

If ships of war, the prizes are to be divided among the officers, seamen, &c. as his majesty shall appoint by proclamation; but among privateers, the division is according to the agreement between the owners.

By stat. 13 Geo. II. c. 4. Judges and officers, failing of their duty, in respect to the condemnation of prizes, forfeit five hundred pounds, with full costs of suit; one moiety to the king, and the other to the informer.

PROBABILITY is nothing but the appearance of the agreement or disagreement of two ideas by the intervention of proofs whose connection is not constant and immutable, or is not perceived to be so; but is, or appears for the most part to be so; and is enough to induce the mind to judge the proposition to be true or false, rather than the contrary.

Of probability there are degrees from the neighbourhood of certainty and demonstration, quite down to improbability and unlikeliness, even to the confines of impossibility; and also degrees of assent, from certain knowledge, and, what is next to it, full assurance and confidence, quite down to conjecture, doubt, distrust, and disbelief.

That proposition then is probable for which there are arguments or proofs to make it pass or be received for true. Probability being then to supply the defect of our knowledge, is always conversant about a thing whereof we have no certainty, but only some inducements to receive it for true. The grounds of it are in short these two following:

First, the conformity of any thing with our own knowledge, experience, or observation.

Secondly, the testimony of others vouching their observation and experience. In the testimony of others, is to be considered, 1. the number; 2. the integrity; 3. the skill of the witnesses; 4. the design of the author, if it be a testimony cited out of a book; 5. the consistency of the parts and circumstances of the relation; 6. contrary testimonies. The mind, before it rationally assents or dissents to any probable proposition, ought

to examine all the grounds of probability, and see how they make more or less for or against it; and, upon a due balancing the whole, reject or receive it, with a more or less firm assent, according to the preponderancy of the greater grounds of probability, on one side, or the other.

PROBABILITY, in poetry, the appearance of truth in the fable or action of a poem. See the articles **DRAMA**, **FABLE**, **EPIC**, **POETRY**, &c.

PROBATE of a will or testament, in law, is the exhibiting and proving of last wills and testaments before the ecclesiastical judge delegated by the bishop who is ordinary of the place where the party died.

If all the goods and chattels of the deceased, as well as debts owing to him, are in the same diocese, the bishop of that diocese is intitled to the probate of the will; but if such personal estate, or effects, are dispersed in several diocesses, so that there be five pounds out of the diocese where the party lived, in that case the archbishop of Canterbury or York becomes ordinary.

A probate may be made two ways, either in common form, or *per testes*; the proof in common form is only by the oath of the executor, or party exhibiting the will, who swears to his belief, that the will by him exhibited is the last will and testament of the deceased. The proof *per testes* is, when besides his own oath he produces witnesses, or makes other proof, and that in the presence of such persons as may claim any interest in the goods of the deceased, or at least in their absence, after they have been duly summoned to see the will proved, if they think fit; which latter course is generally followed where there is fear of contention.

PROBATION, in the universities, is the examination and trial of a student who is about to take his degrees.

PROBATION, in a monastic sense, signifies the year of novitiate which a religious must pass in a convent, to prove his virtue and vocation, and whether he can bear the severities of the rule.

PROBATIONER, in the church of Scotland, a student in divinity, who bringing a certificate from a professor in an university of his good morals, and his having performed his exercises to approbation, is admitted to undergo several trials. The trials of probationers are private before

before a presbytery, and public before a congregation, the presbytery being present. The private trials are an homily or two, and an exegesis; that is, a theological subject is given in to the presbytery in theses, and the probationer answers any objections which any minister in the presbytery makes against those theses. They also examine him on his knowledge of the greek and latin languages, &c. The public trials are a popular sermon, and an exercise and addition; that is, a text is handled half an hour logically and critically, and for half an hour more practically.

If in all these he gains the approbation of the presbytery, he signs the confession of faith, and promises obedience to the judicatories of the kirk; upon which he receives a licence to preach.

PROBATOR, in law, one who undertakes to prove a crime charged upon another; properly, an accomplice in the crime who impeaches others.

PROBATUM EST, *it is proved*, a term frequently subjoined to a receipt for the cure of some disease.

PROBE, a surgeon's instrument for examining the circumstances of wounds, ulcers, and other cavities, searching for stones in the bladder, &c. See the article **LITHOTOMY**, &c.

PROBLEM, *προβλημα*, in logic, a proposition that neither appears absolutely true or false; and, consequently, may be asserted either in the affirmative or negative.

A logical or dialectical problem, according to the schoolmen, consists of two parts; a subject, about which the doubt is raised; and a prædicate, or attribute, which is the thing doubted whether it be true of the subject or not.

Problems may be divided into physical, ethical, and metaphysical; physical, when it is doubted whether such and such properties belong to certain natural bodies; ethical, when the doubt is, whether or not it be proper to do or omit certain actions; and metaphysical, when the doubt relates to spirits, &c.

PROBLEM, in geometry, is a proposition, wherein some operation or construction is required; as to divide a line or angle, erect or let fall perpendiculars, &c.

According to Wolfius, a problem consists of three parts; the proposition, which expresses what is to be done; the solution, wherein the several steps whereby the thing required is to be effected, are

rehearsed in order; and, lastly, the demonstration, wherein is shewn, that by doing the several things prescribed in the solution, the thing required is obtained.

PROBLEM, in algebra, is a question or proposition which requires some unknown truth to be investigated, and the truth of the discovery demonstrated. So that a problem is to find a theorem. See the article **THEOREM**.

Kepler's **PROBLEM**, in astronomy, is the determining a planet's place from the time; so called from Kepler, who first proposed it. It was this, to find the position of a right line, which, passing through one of the foci of an ellipsis, shall cut off an area described by its motion, which shall be in any given proportion to the whole area of the ellipsis. See the article **ANOMALY**.

The proposer knew no way of solving the problem but by an indirect method; but Sir Isaac Newton, Dr. Keill, &c. have since solved it directly and geometrically, several ways.

Deliacal **PROBLEM**, or a problem for finding two mean proportionals between two given lines, in geometry, is the doubling of the cube; it was so called from the people of Delos, who, upon consulting the oracle for a remedy against a plague, were answered, that the plague should cease when Apollo's altar, which was in form of a cube, should be doubled. See the article **DUPLICATION**.

Local **PROBLEM**. See the article **LOCAL**. **PROBLEMATICAL RESOLUTION**, in algebra, a method of solving difficult questions by certain rules, called canons. **PROBOSCIS**, in natural history, is the trunk or snout of an elephant, and some other animals and insects. See the article **ELEPHANT**.

Flies, gnats, &c. are furnished with a proboscis, or trunk; by means of which they suck the blood of animals, the juice of vegetables, &c. for their food. See the articles **FLY**, **GNAT**, **BEE**, &c.

PROCATARCTIC CAUSE, in medicine, the pre-existing, or pre-disposing cause or occasion of a disease. See the article **DISEASE**.

PROCEDENDO, in law, a writ whereby a plea or cause, formerly called from an inferior court to the court of Chancery, King's bench, or court of Commonpleas, by writ of privilege, habeas corpus, or certiorari, is released, and returned to the other court to be proceeded in,

in, upon its appearing that the defendant has no cause of privilege, or that the matter in the party's allegation is not well proved.

PROCEDURE, or **PROCEEDINGS**, in law, the course of the several acts, instructions, &c. of a process or law-suit.

It is either civil or criminal: civil procedure relates to the estate alone; criminal or extraordinary procedure, where the person is prosecuted.

PROCEED, among merchants, whatever arises from any thing.

PROCELEUSMATICUS, in the antient poetry, a foot consisting of four short syllable, or two pyrrhichiuses, as *boni-nibus*. See **FOOT** and **PYRRHICHUS**.

PROCELLARIA, the **STORM-BIRD**, in ornithology, a genus of birds, belonging to the order of the passerres, the characters of which are these: the beak is of a compressed figure, the upper and under chops are of an equal length, and the upper one is hooked at the point; the nostrils are of a cylindric form, run parallel, and grow to the beak; and the feet are palmated.

It is about the size of the common water-wagtail, and its general colour is black, very glossy on the head and back, only the covering feathers of the wings have some white toward their tips. Before a storm it always gets under the covert of ships sailing in the northern seas, which is a sure token of an approaching storm; whence the name.

PROCESS, in law, denotes the proceedings in any cause, real or personal, civil or criminal, from the original writ to the end thereof.

In a more limited sense, process denotes that by which a man is first called into any temporal court.

The difference between process and precept, or warrant, is, that the latter is only to attach or convene the party, before any indictment or conviction, and may be either in the king's or justice's name: but process is always in the king's name, and commonly after an indictment.

PROCESS, in chemistry, the whole course of an experiment or series of operations, tending to produce something new.

PROCESS, *processus*, in anatomy, denotes any protuberance or eminence in a bone.

PROCESSION, *processio*, in theology, denotes the manner in which the Holy Ghost is conceived to issue from the Father and Son, in the mystery of the

Trinity. See the article **TRINITY**.

PROCESSION also denotes a ceremony in the romish church, consisting of a formal march of the clergy and people, putting up prayers, &c. and in this manner visiting some church, &c. They have also processions of the host or sacrament, &c. See the article **HOST**, &c.

PROCESSUM CONTINUANDO, a writ for continuing a process after the death of the chief justice, or other justices of oyer and terminer.

PROCHEIN AMY, *proximus amicus*, in law, the person next a kin to a child in non-age, and who, in that respect, is allowed to act for him, and be his guardian, &c. if he hold land in soccage.

To sue, an infant is not allowed to make an attorney; but the court will admit his next friend as plaintiff; or his guardian as defendant.

PROCIDENTIA ANI, UTERI, &c. the same with prolapsus. See the article **PROLAPSUS**.

PROCLAMATION, a public notice given of any thing of which the king thinks proper to advertise his subjects.

Proclamations are a branch of the king's prerogative, and no person can make them without the king's authority, except mayors of towns, &c. by custom of privilege. Proclamations which require the people to do, or not to do, certain things, have the force of laws; but then they are supposed to be consistent with the laws already in being, otherwise they are superseded.

Proclamation is used for a solemn declaration of war and peace, and for the act of notifying the accession of a prince to the throne; and also for the public declaration used at the calling of a court, and likewise on the discharge or adjourning; both for the attendance of persons, and dispatch of business there.

In courts baron, proclamation is made for any person to come in and claim copyholds that are vacant, and of which any tenant died seised since the last court; after which the lord may seize the copyhold, if the heir does not come in to be admitted: and before a parliament is dissolved, proclamation is made, that if any person has any petition he may come in and be heard.

Proclamation of rebellion, is a writ by which a person who does not appear upon a subpœna, or an attachment of contempt in the court of Chancery, is reputed and declared a rebel, if he does not

surrender himself by a day assigned.

For proclamation of a fine, and proclamation of exigents, see the articles FINE and EXIGENTS.

PROCONDYLUS, a name given to the first joint of each finger. See the article **CONDYLUS**.

PRO-CONFESSO, in law, is where a bill is exhibited in chancery, and the defendant appears, and is in contempt for not answering: in this case the whole matter contained in the bill shall be taken as if it were confessed by the defendant.

PROCONSUL, a roman magistrate, sent to govern a province with consular authority.

The proconsuls were appointed out of the body of the senate, and usually as the year of any one's consulate expired, he was sent proconsul into some province. The proconsuls decided cases of equity and justice, either privately in their prætorium or palace, where they received petitioners, heard complaints, granted writs under their seal, and the like; or else publicly, in the common-hall, with the usual formalities observed in the court of judicature at Rome. They had besides, by virtue of their edicts, the power of ordering all things relating to the tribunes, taxes, contributions, and provisions of corn and money, &c. Their office lasted only a year. See **CONSUL**.

PROCONSUL, in our antient law books, is the same with justice in eyre. See the article **JUSTICE**.

PROCREATION, the begetting and bringing forth children. See the article **GENERATION**.

PROCTOR, a person commissioned to manage another person's cause in any court of the civil or ecclesiastical law.

The proctors of the clergy, are the representatives chosen by the clergy to sit in the lower house of convocation: of these there are two for each diocese, and one for each collegiate church.

PROCTORS, in an university, are two officers chosen from among the students to see good order and exercises daily performed.

PROCURATION, or **PROCURACY**, an act or instrument by which a person is empowered to treat, transact, receive, &c. in another person's name. This word is now little used in this sense, except in the case of a person who collects the fruits of a benefice for another.

The same word is used for certain sums

of money annually paid by parish-priests to the bishop or archdeacon, on account of visitation, and which, in former times, were paid in necessary victuals and provisions for the visitor and his attendants.

PROCURATOR, a person who has a charge committed to him, to act for another.

Thus the proxies of the lords in parliament are, in our law books, called procurators: the bishops are sometimes called *procuratores ecclesiarum*; and the representatives sent by the clergy to convocation, *procuratores clerici*. The word is also used for a vicar or lieutenant; and we read of a procurator regni, who was an antient magistrate. Those who manage causes in Doctor's commons are also called procurators or proctors. In our statutes, he who gathers the fruits of a benefice for another is particularly called a procurator, and the instrument empowering him to receive them is termed a procuracy.

PROCURATOR, is also a kind of magistrate in several cities in Italy, as the procurators of St. Mark at Venice, Genoa, &c. The procurators of St. Mark are the administrators of that church, and of the revenues attached to it: they are the patrons of orphans, and the executors of testaments, and are clothed in black velvet with ducal sleeves.

PROCYON, in astronomy, a fixed star of the second magnitude in the constellation, called canis minor. See **CANIS**.

PRODICTATOR, in roman antiquity, a magistrate who had the power, and did the office, of a dictator. See the article **DICTATOR**.

They sometimes created this magistrate where they could not have a dictator.

PRODUCING, in geometry, signifies the drawing out a line farther till it have any assigned length.

PRODUCT, in arithmetic and geometry, the factum of two or more numbers, or lines, &c. into one another: thus $5 \times 4 = 20$, the product required.

In lines it is always (and in numbers sometimes) called the rectangle between the two lines, or numbers, multiplied by one another.

PRODUCTION, in anatomy, the same with process. See **PROCESS**.

PROEM, a term sometimes used for prelude & preface. See the articles **PREFLUDE** and **PREFACE**.

PRO

PROEMPTOSIS, in astronomy, the appearance of the new moon a day later, by reason of the lunar equation. See the article **MOON**.

PROFANATION, the acting disrespectfully to sacred things.

PROFANE, a term used in opposition to holy, and, in general, is applied to all persons who have not the sacred character, and to things which do not belong to the service of religion.

PROFER, in law, the time appointed for the accounts of sheriffs, and other officers, to be given in to the Exchequer, which should be twice a year, by stat. 5 Hen. III.

It also denotes an offer, or endeavour, to proceed in an action by a person concerned so to do.

PROFESSION, *professio*, among the Romanists, denotes the entering into a religious order, whereby a person offers himself to God, by a vow of inviolably observing obedience, chastity, and poverty.

PROFESSOR, in the universities, a person who teaches or reads public lectures in some art or science from a chair for the purpose.

In the foreign and scottish universities, professors teach the arts, and have their classes of pupils; but those in England only read public lectures in term-time.

Some professors are denominated from the arts they profess, others from the founders of the professorships, or those who assigned a revenue for the support of the professors. Such are the savilian professors, at Oxford; the lucasian, at Cambridge; and the regius professors for reading lectures in each of our universities, on divinity, hebrew, greek, law, and physic: so called from these lectures being founded by king Henry VIII.

PROFILE, in architecture, the draught of a building, fortification, &c. wherein are expressed the several heights, widths, and thicknesses, such as they would appear, were the building cut down perpendicularly from the roof to the foundation. It is also called section, orthographical section, and, by Vitruvius, sciagraphy.

This is the same as elevation, in opposition to a plan, ichnography. See the article **FORTIFICATION**.

PROFILE also denotes the outline of a figure, building, member of architecture, &c. Hence profiling sometimes denotes designing or describing the member with a rule, compass, &c.

PROFILE, in sculpture and painting, denotes a head, portrait, &c. when represented side-ways, or in a side view. On almost all medals, faces are represented in profile.

PROFLUVIUM, in medicine, denotes a flux, or liquid evacuation, of any thing. See the article **FLUX**.

PROGNOSTICS, *προσῆγοις*, among physicians, signifies a judgment concerning the event of a disease, as whether it shall end in life or death, be short or long, mild or malignant, &c. See the articles **DISEASE**, **SIGN**, and **INDICATION**.

A prudent physician will be very cautious in delivering his prognostic, and not, like bold quacks, promise all will go well, whether the case is curable or not. He ought to avoid both extremes, and to declare from his conscience what he takes to be the true state of the patient; only in dangerous cases he should do it to the relations, and at the same time tell his reasons both for hope and fear; for as to the patient himself, it is proper to cherish him with hopes of a recovery, both because some disorders are much aggravated by fear, and the expectation of future health and ease has often a happy effect.

PROGRAMMA, antiently signified a letter, sealed with the king's seal.

Programma is also an university-term for a billet or advertisement, posted up, or given into the hand, by way of invitation to an oration, &c. containing the argument, or so much as is necessary for understanding thereof.

PROGRESSION, in general, denotes a regular advancing, or going forward, in the same course and manner.

PROGRESSION, in mathematics, is either arithmetical or geometrical. Continued arithmetic proportion, where the terms do increase and decrease by equal differences, is called arithmetic progression:

thus $\{ a, a+d, a+2d, a+3d, \&c. \text{ increasing} \}$ by the difference d .

$\{ a, a-d, a-2d, a-3d, \&c. \text{ decreasing} \}$

In numbers $\{ 2, 4, 6, 8, 10, \&c. \text{ increasing} \}$ by the difference 2.

$\{ 10, 8, 6, 4, 2, \&c. \text{ decreasing} \}$

But since this progression is only a compound of two series, viz.

of $\{ \text{Equals } a, a, a, a, a, \&c. \}$
 $\{ \text{Arith. proportionals } 0, \pm d, \pm 2d, \pm 3d, \pm 4d, \&c. \}$

Therefore the most natural arithmetic progression is that which begins with 0: as

$$0, \pm d, \pm 2d, \pm 3d, \pm 4d, \begin{cases} \text{increasing.} \\ \text{decreasing.} \end{cases}$$

In any arithmetical progression,

If $\begin{Bmatrix} a \\ d \\ n \\ l \\ s \end{Bmatrix}$ be the $\begin{cases} \text{first term} \\ \text{common difference,} \\ \text{number of terms,} \\ \text{last term,} \\ \text{sum of all the terms;} \end{cases}$ then any three of these terms being given, the other two are easily found.

And the several cases are reducible into ten propositions, which are all solved by the two following lemmata.

Lemma I. In any arithmetic progression,

$$\text{it is, } 1 : \frac{n}{2} :: a + l : s$$

$$\text{For } \begin{Bmatrix} a \\ a+d \\ a+2d \\ a+3d \\ \vdots \\ a+l \\ \text{\textcircled{C}} \end{Bmatrix} + \begin{Bmatrix} l \\ l-d \\ l-2d \\ l-3d \\ \vdots \\ l-l \\ \text{\textcircled{C}} \end{Bmatrix} = \begin{Bmatrix} a+l \\ a+l \\ a+l \\ a+l \\ \vdots \\ a+l \\ \text{\textcircled{C}} \end{Bmatrix}$$

Therefore $s + s = a + l \times n$. That is,

$$2s = a + l \times n. \text{ Consequently, } 1 : \frac{n}{2} :: a + l : s.$$

From this the following corollaries naturally follow.

$$\text{Cor. I. } a = \frac{2s}{n} - l = \frac{2s - nl}{n} = 2s - nl \times \frac{1}{n}$$

$$\text{Cor. II. } n = \frac{2s}{a+l} = 2 \times \frac{s}{a+l} = 2s \times \frac{1}{a+l}$$

$$\text{Cor. III. } l = \frac{2s}{n} - a = \frac{2s - na}{n} = 2s -$$

$$na \times \frac{1}{n}.$$

$$\text{Cor. IV. } s = \frac{n}{2} \times a + l = \frac{n \times a + l}{2} = \frac{na + nl}{2} = n \times \frac{a+l}{2}.$$

Lemma II. In any arithmetic progression it is $1 : n - 1 :: d : l - a$.

For, $a, a+d, a+2d, a+3d, a+n-1 \times d = l$. That is, $n-1 \times d = l-a$, by transposition. Therefore, $1 : n-1 :: d : l-a$. From this likewise the four following corollaries are deduced.

$$\text{Cor. I. } a = l - n - 1 \times d = l - nd + d.$$

$$\text{Cor. II. } n = \frac{l-a}{d} + 1 = \frac{l-a+d}{d}.$$

$$\text{Cor. III. } d = \frac{l-a}{n-1} = l-a \times \frac{1}{n-1}.$$

$$\text{Cor. IV. } l = a + n - 1 \times d = a + nd - d.$$

Prop. I. Given $a = 2 =$ the first term, $d = 2 =$ the common difference, $n = 5 =$ the number of terms; required $l =$ the last term, and $s =$ the sum of all the terms.

Solution. 1. $l = a + nd - d = \frac{2s - na}{n} = 30$ by Lem. I. and II.

Then, $na + nnd - nd = 2s - na$; and $2s = 2na + nnd - nd$, by transposition.

2. Therefore, $s = na + \frac{nnd - nd}{2}$ by division $= 240$.

Prop. II. Given a, d, l ; required n, s .

Solution. 1. $n = \frac{l-a+d}{d} = \frac{2s}{a+l}$ by Lem. I. and II.

Then, $2ds = ll + ld - a^2 + ad$, by multiplication.

2. Therefore, $s = \frac{ll + ld - a^2 + ad}{2d}$ by division.

Prop. III. Given a, d, s ; required n, l .

Solution. Since $l = \frac{2s - na}{n} = a + nd - d$ by Lem. I. and II.

Therefore, $nnd + 2na - nd = 2s$, by multiplication and transposition.

And $nn + \frac{2a-d}{d}n = \frac{2s}{d}$ by division.

1. Then, $n = \frac{\sqrt{aa + \frac{1}{4}dd - ad + 2ds} - a}{d} + \frac{1}{2}.$

And because $n = \frac{2s}{a+l} = \frac{l-a+d}{d}$ by Lem. I. and II.

Therefore, $ll + dl = 2ds - ad + aa$, by multiplication and transposition.

2. Then $l = \sqrt{2ds - ad + aa + \frac{1}{4}dd} - \frac{1}{2}d$, by completing the square and evolution.

Prop. IV. Given a, l, s ; required n, d .

Solution. 1. $n = \frac{2s}{l+a} = \frac{l-a+d}{d}$ by Lem. I. and II.

Then, $2ds - ld - ad = ll - aa$, by multiplication and transposition.

2. Therefore, $d = \frac{ll - aa}{2s - l - a}$ by division.

Prop. V. Given a, n, s ; required l, d .

Solution. 1. $l = \frac{2s - na}{n} = a + nd - d$ by Lem. I. and II.

Then $nnd - nd = 2s - 2na$ by multiplication and transposition.

2. Therefore, $d = \frac{2s - 2na}{nn - n}$, by division.

Prop. VI. Given a, n, l ; required d, s .

Solution. 1. $d = \frac{l-a}{n-1} = l-a \times \frac{1}{n-1}$, by Lem. II.

$$2. s = \frac{na + nl}{2} = a + l \times \frac{n}{2}, \text{ by Lem. I.}$$

Prop. VII. Given d, l, n ; required a, s .

$$\text{Solution. 1. } a = l - nd + d = \frac{2s - nl}{n} \text{ by Lem. II. and I.}$$

Then, $2s = 2nl - nnd + nd$, by multiplication and transposition.

$$2. \text{ Therefore, } s = \frac{2nl - nnd + nd}{2}, \text{ by division.}$$

Prop. VIII. Given d, n, s ; required a, l .

$$\text{Solution. Since } l = a + nd - d = \frac{2s - na}{n} \text{ by Lem. II. and I.}$$

Then, $2na = 2s - nnd + nd$, by multiplication and transposition.

$$1. \text{ Therefore, } a = \frac{2s - nnd + nd}{2n}, \text{ by division.}$$

$$\text{And, since } a = l - nd + d = \frac{2s - nl}{n}, \text{ by Lem. II. and I.}$$

Then, $2nl = 2s + nnd - nd$, by multiplication and transposition.

$$2. \text{ Therefore, } l = \frac{2s + nnd - nd}{2n}, \text{ by division.}$$

Prop. IX. Given d, l, s ; required a, n .

$$\text{Solution. Since } n = \frac{2s - l - a + d}{a + l - d}, \text{ by Lem. I. and II.}$$

Then $aa - ad = ll + ld - 2ds$, by multiplication and transposition.

$$1. \text{ Therefore, } a = \pm \sqrt{ll + ld - 2ds + \frac{1}{4}dd} + \frac{1}{2}d.$$

$$\text{And because } a = l - nd + d = \frac{2s - nl}{n}, \text{ by Lem. II. and I.}$$

Therefore $-nnd + 2nl + nd = 2s$, by multiplication and transposition.

$$\text{And } -nn + \frac{2l + d}{d}n = \frac{2s}{d}, \text{ by division.}$$

$$2. \text{ Then, } n = \frac{l \pm \sqrt{ll + \frac{1}{4}dd + ld - 2ds}}{d}$$

Therefore

To which add

The sum is

$$\text{From } (l + d)^{n+1} = (a + 4d^4) = a^4 + 16a^3d + 96a^2d^2 + 256ad^3 + 256d^4$$

$$\text{Subtract } a^{n+1} + nd^{n+1} + z = a^4 + 24a^2d^2 + 88ad^3 + 112d^4$$

$$\text{Then } (l + d)^{n+1} - a^{n+1} + nd^{n+1} + z = 16a^3d + 72a^2d^2 + 168ad^3 + 144d^4.$$

$$\text{And } \frac{16a^3d + 72a^2d^2 + 168ad^3 + 144d^4}{(m =) 4d} = 4a^3 + 18a^2d + 42ad^2 + 36d^3, \text{ the}$$

sum of the cubes the given cubes of the given terms. Because

$$\text{The cube of } \begin{cases} a \\ a + d \\ a + 2d \\ a + 3d \end{cases} \text{ is } \begin{cases} a^3 \\ a^3 + 3a^2d + 3ad^2 + d^3 \\ a^3 + 6a^2d + 12ad^2 + 8d^3 \\ a^3 + 9a^2d + 27ad^2 + 27d^3 \end{cases}$$

$$\text{The sum is } 4a^3 + 18a^2d + 42ad^2 + 36d^3 \text{ The}$$

Prop. X. Given n, l, s ; required a, d .

$$\text{Solution. 1. } a = \frac{2s - nl}{n} = l - nd + d, \text{ by Lem. I. and II.}$$

Then, $2nl - 2s = nnd - nd$, by multiplication and transposition.

$$2. \text{ Therefore, } d = \frac{2nl - 2s}{nn - n}, \text{ by division.}$$

To find the sum of the powers of any arithmetic PROGRESSION.

Preparation. Suppose n the index of the power.

Let each term of the progression be raised to each power, under that whose sum is sought. And let the sum of each rank so raised, be multiplied by the multiple of the like dimension of a in $(a + d)^{n+1}$. Put z for the sum of all the products.

And m for the multiple of a^n , in the power $(a + d)^{n+1}$.

Solution.

$$\text{Then } \frac{(l + d)^{n+1} - a^{n+1} + nd^{n+1} + z}{m}$$

is the sum of any series of powers, whose roots are arithmetically proportional. For suppose the sum of the cubes of this arithmetic progression $a, a + d, a + 2d, a + 3d$, was required.

$$1. (a + d)^{n+1} = (a + d)^4 = a^4 + 4a^3d + 6a^2d^2 + 4ad^3 + d^4, \text{ and the sum of this series is } 4a + 6d. \text{ Which multiply by } 4d^3$$

(the multiple of a into $(a + d)^{3+1}$) the product will be $16ad^3 + 24d^4$. Also the sum of their squares is $4a^2 + 12ad + 14d^2$. Which multiply by $6d^2$ (the multiple of a^2 in $(a + d)^{3+1}$) the product will be $24a^2d^2 + 72ad^3 + 84d^4$.

$$z = 24a^2d^2 + 88ad^3 + 108d^4 = \text{sum of these products}$$

$$a^4 + 24a^2d^2 + 88ad^3 + 112d^4 (= a^{n+1} + nd^{n+1} + z)$$

$$\text{From } (l + d)^{n+1} = (a + 4d^4) = a^4 + 16a^3d + 96a^2d^2 + 256ad^3 + 256d^4$$

$$\text{Subtract } a^{n+1} + nd^{n+1} + z = a^4 + 24a^2d^2 + 88ad^3 + 112d^4$$

$$\text{Then } (l + d)^{n+1} - a^{n+1} + nd^{n+1} + z = 16a^3d + 72a^2d^2 + 168ad^3 + 144d^4.$$

$$\text{And } \frac{16a^3d + 72a^2d^2 + 168ad^3 + 144d^4}{(m =) 4d} = 4a^3 + 18a^2d + 42ad^2 + 36d^3, \text{ the}$$

sum of the cubes the given cubes of the given terms. Because

$$\text{The cube of } \begin{cases} a \\ a + d \\ a + 2d \\ a + 3d \end{cases} \text{ is } \begin{cases} a^3 \\ a^3 + 3a^2d + 3ad^2 + d^3 \\ a^3 + 6a^2d + 12ad^2 + 8d^3 \\ a^3 + 9a^2d + 27ad^2 + 27d^3 \end{cases}$$

$$\text{The sum is } 4a^3 + 18a^2d + 42ad^2 + 36d^3 \text{ The}$$

The same with the quotient before found. It is the same in any other series for any other power.

Geometric PROGRESSION, or continued geometric proportion, is when the terms do increase or decrease by equal ratios: thus,

$$\begin{aligned} & a, ar, arr, arrr, \&c. \text{ increasing} \\ & a, \frac{a}{r}, \frac{a}{rr}, \frac{a}{rrr}, \&c. \text{ decreasing} \end{aligned} \left. \begin{array}{l} \\ \end{array} \right\} \text{from a continual } \left. \begin{array}{l} \text{multiplication} \\ \text{division} \end{array} \right\} \text{by } r.$$

$$\begin{aligned} & 2, 4, 8, 16, 32, 64, \text{ increasing} \\ & 64, 32, 16, 8, 4, 2, \text{ decreasing} \end{aligned} \left. \begin{array}{l} \\ \end{array} \right\} \text{from a continual } \left. \begin{array}{l} \text{multiplication} \\ \text{division} \end{array} \right\} \text{by } 2.$$

But since this progression is only a compound of two series, viz.

of $\left\{ \begin{array}{l} \text{Equals } a, a, a, a, a, a, \&c. \\ \text{Geometric proportion, } 1, r, r^2, r^3, r^4, r^5, \&c. \end{array} \right\}$

therefore the most natural progression is that which begins with unity,

$$\text{as } \frac{1}{1}, \frac{r}{1}, \frac{r^2}{1}, \frac{r^3}{1}, \frac{r^4}{1}, \frac{r^5}{1} \left\{ \&c. \text{ increasing.} \right.$$

$$\text{that is, } 1, r, r^2, r^3, r^4, r^5$$

$$\text{as } \frac{1}{1}, \frac{1}{r}, \frac{1}{r^2}, \frac{1}{r^3}, \frac{1}{r^4}, \frac{1}{r^5} \left\{ \&c. \text{ decreasing.} \right.$$

$$\text{that is, } 1, r^{-1}, r^{-2}, r^{-3}, r^{-4}, r^{-5}$$

In geometric progression,

If $\left\{ \begin{array}{l} a \\ r \\ n \\ l \\ s \end{array} \right\}$ be the $\left\{ \begin{array}{l} \text{first term,} \\ \text{the ratio,} \\ \text{number of terms,} \\ \text{last term,} \\ \text{sum of all the terms;} \end{array} \right\}$ then any three of these terms being given, the other two are easily found.

And the several cases are reducible to ten propositions, which are solved by the two following lemmata.

Of increasing progressions.

Lem. I. In an increasing geometric progression $a, ar, ar^2, ar^3, ar^4, ar^5, \&c.$ it is $1:r::s-l:s-a$.

For $a:ar::s-l:s-a$.

But $a:ar::1:r$

Therefore $1:r::s-l:s-a$.

Cor. 1. $s = \frac{rl-a}{r-1} = \frac{l-a}{r-1} + l$.

Cor. 2. $r = \frac{s-a}{s-l} = s-a \times \frac{1}{s-l}$.

Cor. 3. $a = s + rl - rs = rl - s \times r - l$.

Cor. 4. $l = \frac{rs-s+a}{r} = \frac{a+r-1 \times s}{r} = s - \frac{s-a}{r}$.

Lem. II. In an increasing geometric progression it is $1:r^{n-1}::a:l$.

For $a, ar, ar^2, ar^3, ar^4, \&c. ar^{n-1} = l$.

Therefore $1:r^{n-1}::a:l$.

Cor. 1. $l = ar^{n-1} = a \times r^{n-1}$.

Cor. 2. $a = \frac{l}{r^{n-1}} = l \times \frac{1}{r^{n-1}}$.

Cor. 3. $n = \frac{L.r^{n-1}}{L.r} + 1 = \frac{L.l-L.a}{L.r} + 1$;

that is, the logarithm of l — the logarithm of a , divided by the logarithm of r .

Cor. 4. $r = \frac{l-a}{l-a}^{n-1}$.

Prop. I. Given a, r, n , required l, s .

1. $l = ar^{n-1} = a \times r^{n-1}$, by Lem. II.

But $s = \frac{rl-a}{r-1}$, by Lem. I. and $r \times l = ar^n$, by multiplication.

2. Therefore $s = \frac{ar^n-a}{r-1} (= a \times \frac{r^n-1}{r-1})$ by substitution.

Prop. II. Given a, r, l ; required s, n .

1. $s = \frac{rl-a}{r-1} = \frac{l-a}{r-1} + l$, by Lem. I.

2. $n = \frac{L.l-L.a}{L.r} + 1$, by Lem. II.

Prop. III. Given a, r, s ; required l, n .

1. $l = \frac{r-1 \times s + a}{r} = ar^{n-1}$, by Lem. I. and II.

Then $r-1 \times s + a = r \times ar^{n-1} = ar^n$, by multiplication.

And $r^n = \frac{r-1 \times s + a}{a}$, by division. But

$nL.r = L. \frac{r-1 \times s + a}{a}$.

2. Therefore $n = \frac{L.r-1 \times s + a - L.a}{L.r}$ by division.

Prop.

Prop. IV. Given a, l, s ; required r, n .

$$1. r = \frac{s-a}{s-l} = \frac{s-a}{s-l} \times \frac{1}{s-l}, \text{ by Lem. I.}$$

$$2. n = \frac{L.l - L.a}{L.r} + 1 = \frac{L.l - L.a}{L.s-a-L.s-l} + 1, \text{ by Lem. II.}$$

Prop. V. Given a, n, s ; required r, l .

$$\text{Since } \frac{sr-s+a}{r} = l = ar^{n-1}, \text{ by Lem.}$$

I. and II.

Then $sr - ar^n = s - a$, by division and transposition.

$$1. \text{ Therefore, } -r^n + \frac{s}{a}r = \frac{s-a}{a} = \frac{s}{a} - \frac{l}{a}$$

$$\text{by division. And since } l = ar^{n-1}, \text{ and } r = \frac{s-a}{s-l};$$

$$\text{therefore } l = a \times \left(\frac{s-a}{s-l} \right)^{n-1}$$

$$2. \text{ Theref. } l \times \left(\frac{s-l}{s-a} \right)^{n-1} = a \times \left(\frac{s-a}{s-l} \right)^{n-1}$$

by multiplication.

Prop. VI. Given a, n, l ; required r, s .

$$1. r = \frac{l-a}{l} \div a^{n-1}, \text{ by Lem. II. But } \frac{l-a}{l} + l = s, \text{ by Lem. I.}$$

$$2. \text{ Therefore } s = \frac{l-a}{l} + l, \text{ by substitution. } l \div a^{n-1} - 1$$

Prop. VII. Given r, n, l ; required a, s .

$$1. a = \frac{l}{r^{n-1}}, \text{ by Lem. II. But } \frac{lr-a}{r-1}$$

$$= s, \text{ by Lem. I. } l r - \frac{l}{r^{n-1}}$$

$$2. \text{ Therefore } s = \frac{l r^n - l}{r^n - r^{n-1}} = \frac{l r^n - l}{r^{n-1}(r-1)}$$

by substitution.

Prop. VIII. Given r, s, n ; required a, l .

Since $sr - s + a = ar^n$, by Lemma I. and II.

Then $sr - s = ar^n - a (= a \times r^{n-1})$ by transposition.

$$1. \text{ Therefore } a = \frac{sr-s}{r^{n-1}} = \frac{r-1}{r^{n-1}} \times s, \text{ by division.}$$

$$\text{And since } s = \frac{l r^n - l}{r^n - r^{n-1}}, \text{ by Prop. VII.}$$

Therefore $a = x : x \left\{ \frac{a^{n-1}}{a} \right\} : s - a$ in $\left\{ \begin{array}{l} \text{a finite} \\ \text{an infinite} \end{array} \right\}$ progression.

$$\text{And } s = \frac{a a - x l}{a - x} \text{ in a finite, or } s = \frac{a a}{a - x}$$

in an infinite decreasing progression.

Question. Suppose a body should move at this rate, viz. in the first moment 10

$$\text{Therefore } sr^n - sr^{n-1} = lr^n - l.$$

$$2. \text{ Therefore } l = \frac{sr^n - sr^{n-1}}{r^n - 1}, \text{ by division.}$$

Prop. IX. Given r, l, s ; required a, n .

$$1. a = s + rl - rs = lr - s \times r^{-1}, \text{ by Lem. I.}$$

$$\text{But } \frac{l}{a} = \left(\frac{l}{s+rl-rs} \right) = r^{n-1} \text{ by Lemma II.}$$

$$\text{And } L. \frac{l}{s+rl-rs} = \frac{n-1}{1} L.r, \text{ by the nature of logarithms.}$$

$$2. \text{ Therefore } n = \frac{L.l - L.s + rl - rs}{L.r} + 1, \text{ by division and transposition.}$$

Prop. X. Given n, l, s ; required r, a .

Since $sr^n - sr^{n-1} = lr^n - l$, by Proposition VIII.

Then $l = sr^{n-1} - sr^n + lr^n (= sr^{n-1} - s + l \times r^n)$ by transposition.

$$1. \text{ Therefore } -r^n + \frac{s}{s-l} r^{n-1} (= \frac{s}{s-l} r^{n-1} - r^n) = \frac{l}{s-l}$$

$$2. a \times \left(\frac{s-a}{s-l} \right)^{n-1} = l \times \left(\frac{s-l}{s-a} \right)^{n-1}, \text{ by Proposition V.}$$

Of decreasing geometric progressions.

In finite decreasing progressions, the same rules will serve for the like propositions, if the series be inverted, so that the least term be the first, and the greatest the last. And since in the increasing progression it is $r-1 : 1 :: l-a : s-l$; therefore in a decreasing geometric proportion it is $r-1 : 1 :: a-l : s-a$, by inverting the terms.

Cor. I. But in an infinite decreasing progression $l=0$; therefore $r-1 : 1 :: a : s-a$. Whence,

| Prop. | Given. | Required. | Solution. |
|-------|--------|-----------|----------------|
| 1. | a | s | $ra \div r-1$ |
| 2. | s, a | r | $s \div s-a$ |
| 3. | s, r | a | $s - s \div r$ |

Cor. II. Also $a - \frac{a}{r} : \frac{a}{r}$ (that is, 1st = 2d : 2d, or x) :: $r-1 : 1$,

miles, in the second 9 miles, in the third $8\frac{1}{10}$, &c. eternally, as 10 to 9.

Here is given $r = \frac{10}{9}$, $a = 10$; required s . Then, by

Cor.

Cor. { I. } $s = \frac{ra}{r-1} = 100 \text{ miles}$
 { II. } $s = \frac{aa}{a-x}$ sought.

That is, a moveable body continuing its motion in that ratio eternally, would only run 100 miles, or more than any thing that is less than 100 miles.

Cor. III. Since $r-1:1::a:s-a$; there-

fore $s-a = \frac{a}{r-1} = a + \frac{a}{r} + \frac{a}{r^2} + \frac{a}{r^3} \&c.$

$= a + \frac{a}{r} + \frac{a}{r^2} + \frac{a}{r^3} \&c.$

Whence if any quantity a , be continually divided by any other quantity r , the sum

of all the terms will be $\frac{a}{r-1}$, that is, $\frac{1}{r-1} \times a$; or the $\frac{1}{r-1}$ of a . Therefore $a \times$

$\frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3} + \frac{1}{r^4} \&c. = a \times \frac{1}{r-1}$. Or,

$\frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3} + \frac{1}{r^4} \&c. = \frac{1}{r-1}$. Where,

if $a = r-1$, then $s = 1$.

Whence, it is evident, that an infinite progression, or an infinitely infinite one, may be collected into one sum; which sum may not be only finite, but equal to nothing. And of infinites it is hence plain, that some are equal, others unequal: and also, that one infinite may be equal to two or more finites, or infinites.

PROHIBITED GOODS, in commerce, the same with contraband goods. See the article **CONTRABAND**.

PROHIBITIO DE VASTO DIRECTA PARTE, in law, is a writ judicial directed to a tenant, prohibiting him from making waste upon the land in controversy during the suit.

This writ is also sometimes directed to the sheriff.

PROHIBITION, in law, is a writ that issues out of the chancery, king's bench, or common pleas, to prohibit some other court, either spiritual or secular, to proceed in a cause there depending, upon a suggestion that the cause does not belong to the court.

PROJECTILES, are such bodies as being put in a violent motion by any great force, are then cast off or let go from the place where they received their quantity of motion: as a stone thrown from a sling, an arrow from a bow, a bullet from a gun, &c.

It is usually taken for granted, by those who treat of the motion of projectiles, that the force of gravity near the earth's surface is every where the same, and

acts in parallel directions; and that the effect of the air's resistance upon very heavy bodies, such as bombs and cannon-balls, is too small to be taken into consideration.

The famous Sir Isaac Newton has shewn, that the gravity of bodies which are above the superficies of the earth, is reciprocally as the squares of their distances from its center; but the theorems concerning the descent of heavy bodies, demonstrated by Gallilæus, and Huygens, and others, are built upon this foundation, that the action of gravity is the same at all distances: and the consequences of this hypothesis are found to be very nearly agreeable to experience. For it is obvious, that the error arising from the supposition of gravity's acting uniformly, and in parallel lines, must be exceeding small; because even the greatest distance of a projectile above the surface of the earth, is inconsiderable, in comparison of its distance from the center, to which the gravitation tends. But then, on the other hand, it is very certain, that the resistance of the air to very swift motions, is much greater than it has been commonly represented. Nevertheless, (in the application of this doctrine to gunnery) if the amplitude of the projection, answering to one given elevation, be first found by experiment (which we suppose) the amplitudes in all other cases, where the elevations and velocities do not very much differ from the first, may be determined, to a sufficient degree of exactness, from the foregoing hypothesis: because, in all such cases, the effects of the resistance will be nearly as the amplitudes themselves; and were they accurately so, the proportions of the amplitudes, at different elevations, would then be the very same as in vacuo. See **RESISTANCE**. Now, in order to form a clear idea of the subject here proposed, the path of every projectile is to be considered as depending on two different forces; that is to say, on the impellant force, whereby the motion is first begun, (and would be continued in a right line) and on the force of gravity, by which the projectile, during the whole time of its flight, is continually urged downwards, and made to deviate more and more from its first direction. As whatever relates to the track and flight of a projectile, or ball, (neglecting the resistance of the air) is to be determined from the action of these two forces, it will be proper, before we proceed

proceed to consider their joint effect, to premise something concerning the nature of the motion produced by each, when supposed to act alone, independent of the other; to which end we have premised the two following lemmata.

Lemma I. Every body, after the impressed force whereby it is put in motion ceases to act, continues to move uniformly in a right-line; unless it be interrupted by some other force or impediment.

This is a law of nature, and has its demonstration from experience and matter of fact.

Corollary. It follows from hence, that a ball, after leaving the mouth of the piece, would continue to move along the line of its first direction, and describe spaces therein proportional to the times of their description, were it not for the action of gravity; whereby the direction is changed, and the motion interrupted.

Lemma II. The motion, or velocity, acquired by a ball, in freely descending from rest, by the force of an uniform gravity, is as the time of the descent; and the space fallen through, as the square of that time.

The first part of this lemma is extremely obvious: for since every motion is proportional to the force whereby it is generated, that generated by the force of an uniform gravity, must be as the time of the descent; because the whole effort of such a force is proportional to the time of its action; that is, as

the time of the descent.

To demonstrate that the distances descended are proportional to the squares of the times, let the time of falling thro' any proposed distance A B, be represented by the right-line P Q; which conceive to be divided into an indefinite number of very small, equal, particles, represented each, by the symbol m ; and let the distance descended in the first of them be A c; in the second c d; in the third d e; and so on.

Then the velocity acquired being always as the time from the beginning of the descent, it will at the middle of the first of the said particles be represented by $\frac{1}{2}m$; at the middle of the second, by $1\frac{1}{2}$

m ; at the middle of the third, by $2\frac{1}{2}m$, &c. which values constitute the series $\frac{m}{2}, \frac{3m}{2}, \frac{5m}{2}, \frac{7m}{2}, \frac{9m}{2}, \&c.$

But since the velocity, at the middle of any one of the said particles of time, is an exact mean between the velocities of the two extremes thereof, the corresponding particle of the distance A B, may be therefore considered as described with that mean velocity: and so, the spaces A c, c d, d e, e f, &c. being respectively equal to the above-mentioned

quantities $\frac{m}{2}, \frac{3m}{2}, \frac{5m}{2}, \frac{7m}{2}, \&c.$ it fol-

lows, by the continual addition of these, that the spaces A c, A d, A e, A f, &c. fallen through from the beginning, will

be expressed by $\frac{m}{2}, \frac{4m}{2}, \frac{9m}{2}, \frac{16m}{2}, \frac{25m}{2}, \&c.$ which are evidently to one an-

other in proportion, as, 1, 4, 9, 16, 25, &c. that is, as the squares of the times. Q. E. D.

Corollary. Seeing the velocity acquired in any number (n) of the aforesaid equal particles of time (measured by the space that would be described in one single particle) is represented by (n) times m , or $n m$; it will therefore be, as one particle of time, is to n such particles, so is $n m$, the said distance answering to the former time, to the distance, $n^2 m$, corresponding to the latter, with the same celerity acquired at the end of the said n particles. Whence it appears that the

space $\frac{n^2 m}{2}$ (found above) through which the ball falls, in any given time n , is just the half of that ($n^2 m$) which might be uniformly described with the last, or greatest celerity in the same time.

Scholium. It is found by experiment, that any heavy body, near the earth's surface (where the force of gravity may be considered as uniform) descends about 16 feet from rest, in the first second of time. Therefore, as the distances fallen through, are proved above to be in proportion; as the squares of the time. It follows that, as the square of one second, is to the square of any given number of seconds, so is 16 feet to the number of feet, a heavy body will freely descend in the said number of seconds. Whence the number of feet descended in any given time will be found, by multiplying the square of the number of seconds

conds by 16. Thus the distance descended in 2, 3, 4, 5, &c. seconds will appear to be 64, 144, 256, 400 feet, &c. respectively. Moreover, from hence, the time of the descent through any given distance will be obtained, by dividing the said distance in feet, by 16, and extracting the square root of the quotient; or, which comes to the same thing, by extracting the square root of the whole distance, and then taking $\frac{1}{2}$ of that root for the number of seconds required. Thus, if the distance be supposed 2640 feet; then, by either of the two ways, the time of the descent will come out 12.84, or 12.50 seconds.

It appears also (from the corol.) that the velocity per second (in feet) at the end of the fall, will be determined by multiplying the number of seconds in the fall by 32. Thus it is found that a ball at the end of 10 seconds, has acquired a velocity of 320 feet per second. After the same manner, by having any two of the four following quantities, *viz.* the force, the times, the velocity, and distance, the other two may be determined: for let the space freely descended by a ball, in the first second of time (which is as the accelerating force) be denoted by F ; also let T denote the number of seconds wherein any distance, D , is descended; and let V be the velocity per second, at the end of the descent; then will

$$V = 2 F T = 2 \sqrt{F D} = \frac{2 D}{T}$$

$$T = \frac{\sqrt{D}}{F} = \frac{V}{2 F} = \frac{2 D}{V}$$

$$D = F T T = \frac{V \cdot V}{4 F} = \frac{T V^2}{2}$$

$$F = \frac{D}{T T} = \frac{V}{2 T} = \frac{V V}{4 D}$$

All which equations are very easily deduced from the two original ones, $D = F T T$, and $V = 2 F T$, already demonstrated; the former in the proposition itself, and the latter in the corollary to it; by which it appears that the measure of the velocity at the end of the first second is $2 F$; whence the velocity (V) at the end of (T) seconds must consequently be expressed by $2 F \times T$ or $2 F T$.

Theorem 1. A projected body, whose line of direction is parallel to the plane of the horizon, describes by its fall a parabola. If the heavy body is thrown by any extrinsecal force, as that of a gun or the like, from the point A, (plate CCKIII.

fig. 3. n^o 1.) so that the direction of its projection is the horizontal line A D; the path of this heavy body will be a semi-parabola. For if the air did not resist it, nor was it acted on by its gravity, the projectile would proceed with an equable motion, always in the same direction; and the times wherein the parts of space A B, A C, A D, A E, were passed over, would be as the spaces A B, A C, A D, &c. respectively. Now if the force of gravity is supposed to take place, and to act in the same tenour, as if the heavy body were not impelled by any extrinsecal force, that body would constantly decline from the right line A E; and the spaces of descent, or the deviations from the horizontal line A E, will be the same as if it had fallen perpendicularly. Wherefore if the body falling perpendicularly by the force of its gravity, passed over the space A K in the time A B, descended thro' A L in the time A C, and thro' A M in the time A D; the spaces A K, A L, A M, will be as the squares of the times, that is, as the squares of the right lines A B, A C, A D, &c. or K F, L G, M H. But since the impetus in the direction parallel to the horizon always remains the same; (for the force of gravity, that only solicites the body downwards, is not in the least contrary to it;) the body will be equally promoted forwards in the direction parallel to the plane of the horizon, as if there was no gravity at all. Wherefore, since in the time A B, the body passes over a space equal to A B; but being compelled by the force of gravity, it declines from the right line A B thro' a space equal to A K; and B F being equal and parallel to A K, at the end of the time A B, the body will be in F, so in the same manner, at the end of the time A E, the body will be in I; and the path of the projectile will be in the curve A F G H I; but because the squares of the right lines K F, L G, M H, N I, are proportionable to the abscisses A K, A L, A M, A N. The curve A F G H I will be a semi-parabola. The path therefore of a heavy body projected according to the direction A E, will be a semi-parabolical curve Q. E. D.

Theorem 2. The curve line, that is described by a heavy body projected obliquely and upwards, according to any direction, is a parabola.

Let A F (fig. *ibid.* n^o 2.) be the direction of projection, any ways inclined to the

the horizon, gravity being supposed not to act, the moving body would always continue its motion in the same right line, and would describe the spaces AB , AC , AD , &c. proportional to the times. But by the action of gravity it is compelled continually to decline from the path AF , and to move in a curve, which will be a parabola. Let us suppose the heavy body falling perpendicularly in the time AB , through the space AQ , and in the time AC , through the space AR , &c. The spaces AQ , AR , AS , will be as the squares of the times, or as the squares of AB , AC , AD . It is manifest from what was demonstrated in the last theorem, that if in the perpendicular BG , there is taken $BM = AQ$ and the parallelogram be completed, the place of the heavy body at the end of the time AB , will be M , and so of the rest; and all the deviations BM , &c. from the right line AF , arising from the times, will be equal to the spaces AQ , AR , AS , which are as the squares of the right lines AB , AC , AD . Thro' A draw the horizontal right line AP , meeting the path of the projectile in P . From P raise the perpendicular PE , meeting the line of direction in E ; and by reason the triangles ABG , ACH , &c. are equiangular, the squares of the right lines AB , AC , &c. will be proportionable to the squares of AG , AH , &c. so that the deviations BM , CN , &c. will be proportionable to the squares of the right lines AG , AH , &c. Let the line L be a third proportional to EP and AP ; and it will be (by 17 El. 6) $L \times EP = APq$. but $APq : AGq :: EP : BM :: L \times EP : L \times BM$; whence since it is $L \times EP = APq$. it will be $L \times BM = AGq$. In like manner it will be $L \times CN = AHq$. &c. But because it is $BG : AG :: (EP : AP :: \text{by hypothesis}) AP : L$; it will be $L \times BG = AG \times AP = AG \times AG + AG \times GP = AGq + AG \times GP$. But it has been shewn that it is $L \times BM = AGq$. wherefore it will be $L \times BG - L \times BM = AG \times GP$, that is, $L \times MG = AG \times GP$. By the same way of reasoning it will be $L \times NH = AH \times HP$, &c. Wherefore the rectangle under MG and L , will be equal to the square of AG , which is the property of the parabola; and so the curve $AMNOPK$ wherein the projectile is moved will be a parabola.

Cor. 1. Hence the right line L is the la-

tus rectum or parameter of the parabola, that belongs to its axis.

Cor 2. Let $AH = HP$, and it will be $L \times CN = AHq = L \times NH$, whence it will be $NH = CN$; and consequently the right line AF being the line of direction of the projectile, will be a tangent to the parabola.

Cor 3. If a heavy body is projected downwards, in a direction oblique to the horizon; the path of the projectile will be a parabola.

Theorem 3. The impetus of a projected body in different parts of the parabola, are as the portions of the tangents intercepted betwixt two right lines parallel to the axis; that is, the impetus of the body projected in the points A and B , (*ibid.* n^o 3.) to which AD , and BE are tangents, will be as CD , and EB , the portions of the tangents intercepted betwixt two right lines CB , and DE parallel to the axis.

We have here treated the path of a projected body as an exact parabola, though from the resistance of the air, the line of a projectile is not exactly parabolical, but rather a kind of hyperbola; which, if considered and applied to practice, would render the computations far more operose, and the very small difference (as experience shews in heavy shot) would, in a great measure, lessen the elegancy of the demonstrations given by accounting for it; since the common rules are sufficiently exact, and easy for practice.

PROJECTION, in mechanics, the act of communicating motion to a body, from thence called projectile. See the preceding article.

In perspective, projection is the appearance or representation of an object on the perspective plane. See PERSPECTIVE. The projection of the sphere is either orthographic, or stereographic. See the articles ORTHOGRAPHIC and STEREOGRAPHIC, MAP, &c.

The former, or orthographic projection supposes the eye placed at an infinite distance; whereas, in the stereographic projection, it is supposed to be only 90^o distant from the primitive circle, or placed in its pole, and thence viewing the circles on the sphere. The primitive circle is that great circle which limits or bounds the representation or projection; and the place of the eye is called the projecting point.

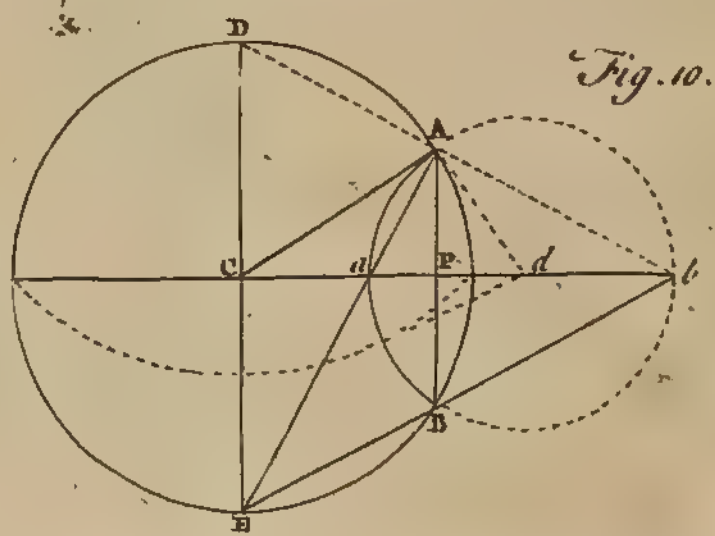
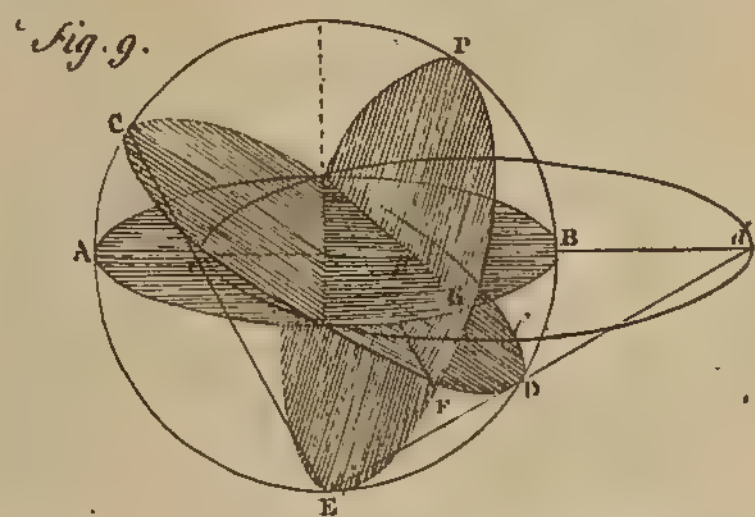
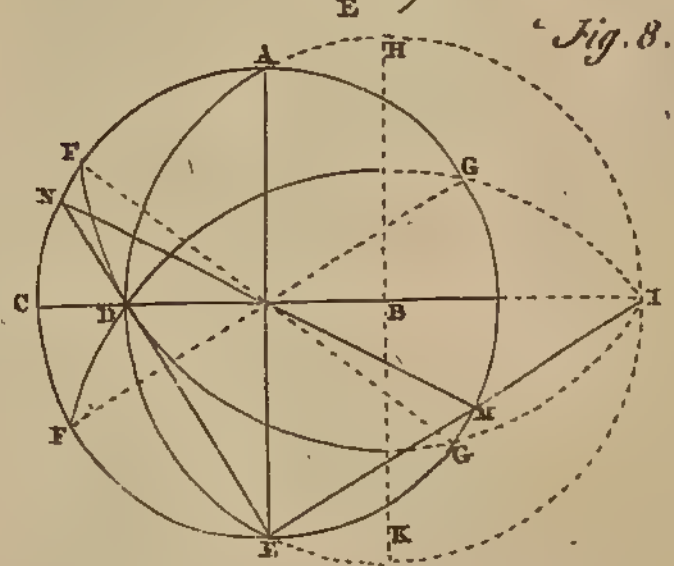
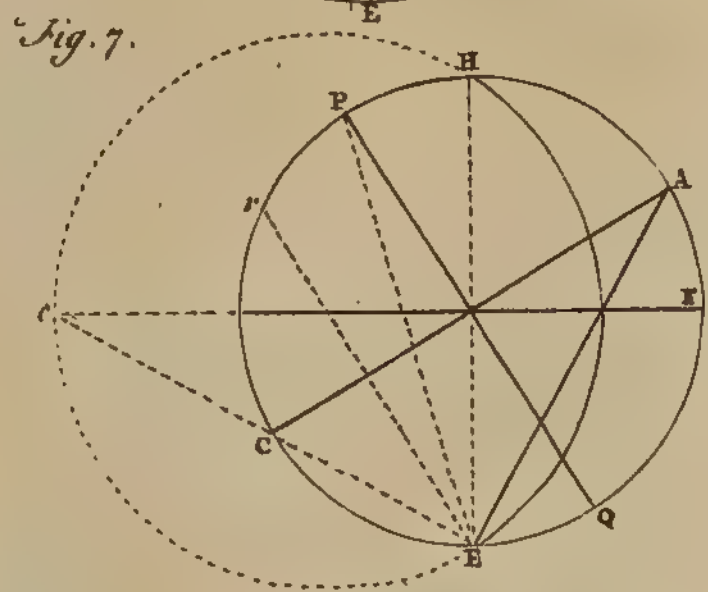
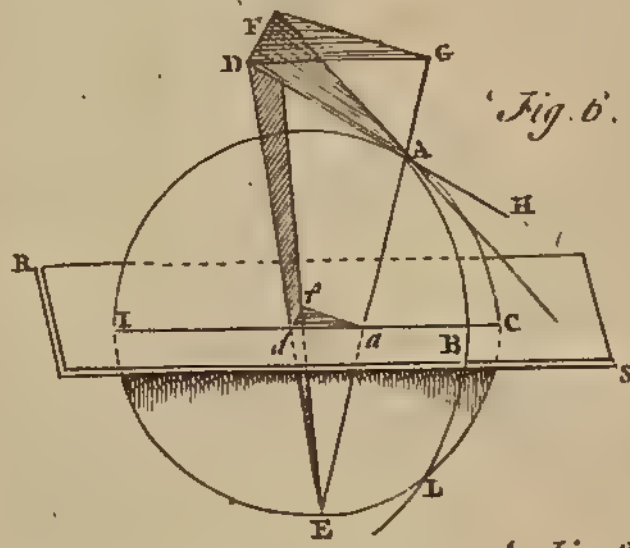
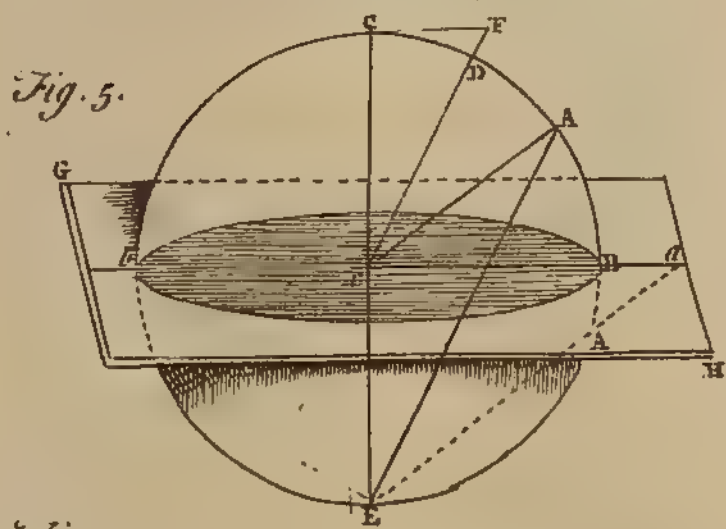
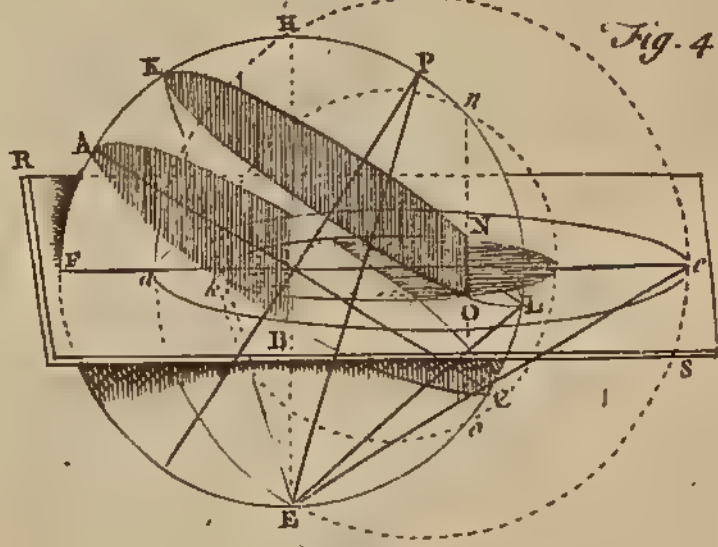
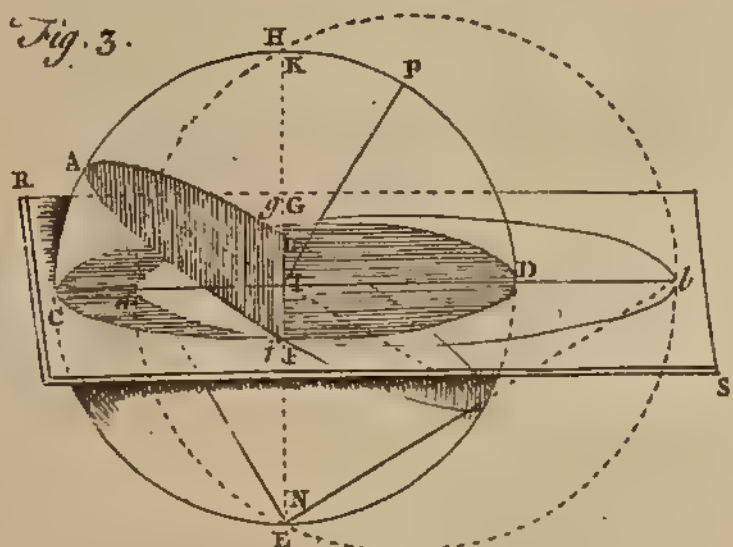
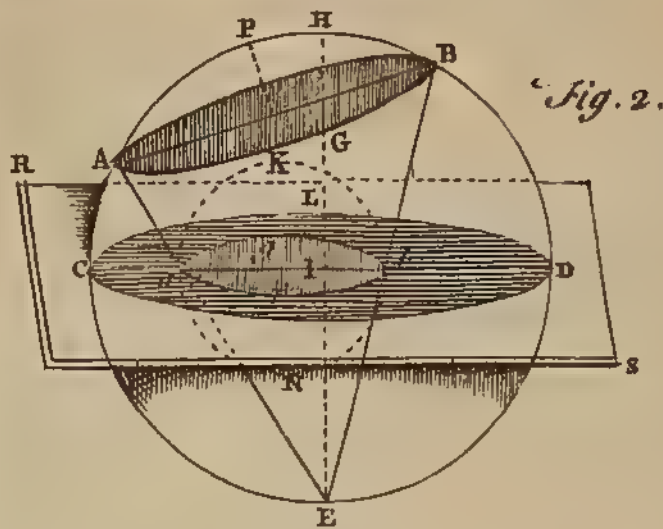
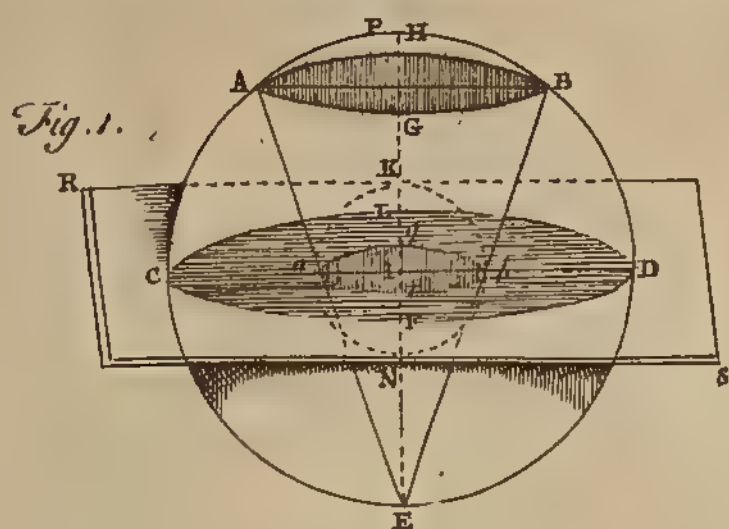
The laws of the orthographic projection are these: 1. The rays by which the eye, placed at an infinite distance, perceives

any object are parallel. 2. A right line, perpendicular to the plane of the projection, is represented by a point, where it cuts the plane of the projection. 3. A right line, as AB , or CD , (pl. CCXIII. fig. 2. n^o 1.) not perpendicular, is projected into a right line, as FE and GH , and is always comprehended between the extreme perpendiculars AF and BE , and CG and DH . 4. The projection of the right line, AB , is the greatest when it is parallel to the plane of projection; being projected in a right line equal to itself. 5. But an oblique line is always projected into one less than itself; and the more so, the nearer it approaches to a perpendicular, which, as already observed, is projected into a point. 6. A plane surface, as $ABCD$, (*ibid.* n^o 2.) at right angles to the plane of the projection, is projected into the right line AB , in which it cuts the plane of the projection; and any arch as Bc , cc , or cA , is projected into the corresponding lines Bo , oo , and oA . 7. A circle parallel to the plane of projection, is represented by a circle equal to itself; and a circle oblique to the plane of projection, is represented by an ellipsis: for the method of putting these rules in practice, see the article MAP.

As to the stereographic projection, its laws are these: 1. The representations of all circles, not passing thro' the projecting point, will be circles. Thus, let $ACEDB$ (plate CCXII. fig. 1. 2. 3.) represent a sphere, cut by a plane RS , passing through the center I , at right angles to the diameter EH , drawn from E the place of the eye; and let the section of the sphere by the plane RS , be the circle $CFDL$, whose poles are H and E . Suppose now AGB is a circle on the sphere to be projected, whose pole most remote from the eye is P ; and the visual rays from the circle AGB , meeting in E , form the cone $AGBE$, whereof the triangle AEB is a section thro' the vertex E , and diameter of the base AB : then will the figure $agbf$, which is the projection of the circle AGB , be itself a circle: for if the plane RS is supposed to revolve on the line CD , till it coincides with the plane of the circle $ACEDB$; then will the circle $CFDL$ coincide with the circle $CEDH$, and the projected circle $agbf$ with the circle $anbk$. Hence, the middle of the projected diameter, is the center of the projected circle, whether it be a great circle

or a small one; the poles and centers of all circles, parallel to the plane of projection, fall in the center of the projection; and all oblique great circles cut the primitive circle in two points diametrically opposite. 2. The projected diameter of any circle subtends an angle at the eye equal to the distance of that circle from its nearest pole, taken on the sphere; and that angle is bisected by a right line, joining the eye and that pole. Thus let the plane RS (*ibid.* fig. 4.) cut the sphere $HFE G$, thro' its center I ; and let ABC be any oblique great circle, whose diameter AC is projected in ac ; and KOL , any small circle parallel to ABC , whose diameter KL is projected in kl . The distances of those circles from their pole P , being the arches AHP , KHP ; and the angles aEc , kEl , are the angles at the eye, subtended by their projected diameters, ac , kl . Then is the angle aEc measured by the arch AHP , and the angle kEl measured by the arch KHP , and those angles are bisected by EP . 3. Any point of a sphere is projected at the distance of the tangent of half the arch intercepted between that point and the pole opposite to the eye, from the center of projection; the semi-diameter of the sphere being radius. Thus, let $CbEB$ (*ibid.* fig. 5.) be a great circle of the sphere, whose center is c , GH the plane of projection cutting the diameter of the sphere in b , B ; E , C , the poles of the section by that plane; and a , the projection of A . Then is ca the tangent of half the arch AC , as is evident by drawing CF the tangent of half that arch, and joining cF . 4. The angle made by two projected circles, is equal to the angle which these circles make on the sphere. For let ACE and ABL (*ibid.* fig. 6.) be two circles on a sphere intersecting in A ; E , the projecting point; and RS , the plane of projection, wherein the point A is projected in a , in the line IC the diameter of the circle ACE . Also let DH , FA , be tangents to the circles ACE , ABL . Then will the projected angle daf be equal to the spheric angle BAC . 5. The distance between the poles of the primitive circle and an oblique circle, is equal to the tangent of half the inclination of those circles; and the distance of their centers, is equal to the tangent of their inclination, the semi-diameter of the primitive being radius. For let AC (*ibid.* fig. 7.) be the diameter of a circle, whose

Stereographic PROJECTION of the Sphere.



whose poles are P and Q, and inclined to the plane of projection in the angle AIF; and let a, c, p , be the projections of the points A, C, P; also let Hae be the projected oblique circle, whose center is q . Now when the plane of projection becomes the primitive circle, whose pole is I; then is $I p =$ tangent of half the angle AIF, or of half the arch AF; and $I q =$ tangent of AF, or of the angle FHae = AIF. 6. If thro' any given point in the primitive circle, an oblique circle be described; then the centers of all other oblique circles passing thro' that point, will be in a right line drawn thro' the center of the first oblique circle at right angles to a line passing thro' that center, the given point, and the center of the primitive: thus let GACE (*ibid.* fig. 8.) be the primitive circle, ADEI a great circle described thro' D, its center being B. HK is a right line drawn thro' B perpendicular to a right line, CI, passing thro' D, B, and the center of the primitive circle. Then the centers of all other great circles, as FDG, passing thro' D, will fall into the line HK. 7. Equal arches of any two great circles of the sphere, will be intercepted between two other circles drawn on the sphere thro' the remotest poles of those great circles. For let PBEA (*ibid.* fig. 9.) be a sphere, whereon AGB, CFD, are two great circles, whose remotest poles are E, P; and thro' these poles let the great circle PBE C, and the small circle PGE, be drawn, intersecting the great circles AGB, CFD, in the points B, G, and D, F. Then are the intercepted arches BG, and DF equal to one another. 8. If lines be drawn from the projected pole of any great circle, cutting the peripheries of the projected circle and plane of projection, the intercepted arches of those circumferences are equal; that is, the arch GB = $f d$, (*ibid.*) 9. The radius of any small circle, whose plane is perpendicular to that of the primitive circle, is equal to the tangent of that lesser circle's distance from its pole; and the secant of that distance, is equal to the distance of the centers of the primitive and lesser circle. For let P (*ibid.* fig. 10.) be the pole, and AB the diameter of a lesser circle, its plane being perpendicular to that of the primitive circle, whose center is C: then d being the center of the projected lesser circle,

$d a$ is equal to the tangent of the arch PA, and $d C =$ secant of PA.

PROJECTURE, in architecture, the out-jetting, prominence, or embossing, which the mouldings, and other members, have beyond the naked wall, column, &c. and is always in proportion to its height. The word is also applied to galleries, balconies, &c. which jet out beyond the face of the wall. Vitruvius gives it as a general rule, that all projecting members in building have their projectures equal to their height; but this is not to be understood of particular members, or mouldings, as dentils, coronas, the fasciæ of architraves, the abacus of the Tuscan and Doric capital, &c. but only of the projectures of intire corniches. Some modern architects are of opinion that the great point in building consists in knowing how to vary the proportions of projectures agreeably to the circumstances of the building. Thus, they say, the nearness and remoteness, making a difference in the view, require different projectures; but it is plain, that the antients had no such intention. M. Perrault observes, that the projecture of the base and cornice, is greater in the antique than the modern building by one third; which seems to follow in a good measure from the antients proportioning the projecture to the height of the pedestal, whereas the moderns make the projecture the same in all the orders, though the height of the pedestal be very different.

PROINDIVISO, in law, is taken for a possession of lands, &c. belonging to two or more, whereof none of them can say which is his portion; each having the whole, &c. as copartners before partition.

PROLABIA, FORE-LIPS, a term in anatomy, for that part of the labia or lips which jets out.

PROLAPSUS, in surgery, a prolapsior, or falling out of any part of the body from its natural situation: thus we say prolapsus intestini, a prolapsion of the intestine, &c.

PROLAPSUS ANI, is such a prolapsion of the intestinum rectum, that it is frequently inverted, or prolapsed to such a degree both in adults and infants, as to appear near a handbreadth hanging out of its natural situation. Heister thinks, that the cause of this disorder may be a great weakness or relaxation in the rectum, which frequently happens to cross and cla-

clamorous children, or from a tenesmus, violent pains of the piles, a dysentery, a stone, or ulcer in the bladder, a difficult expulsion of the birth, or the fæces, &c. The disorder is not difficult to cure when recent and the patient not weak; but in the contrary circumstances, to effect a perfect cure is next to impossible. If a gangrene or cancer should infect the rectum, as in such cases it may, the above mentioned author advises the application of discutient and emollient remedies; and if they prove unsuccessful, an extirpation of the morbid part. The reduction of the intestine, which should be effected as soon as possible, is done and retained in the same manner as is directed in returning and retaining the prolapsed intestines in wounds of the abdomen. See the article ABDOMEN.

PROLAPSUS OCULI, is a distemperature of the eye, in which it is so violently inflamed and swelled, that it cannot be contained in its orbit, but protrudes itself out of its natural seat. The causes of this disorder are various, proceeding sometimes from a violent inflammation, or a redundancy of humours in the eye, from an obstruction of the reductory vessels, and sometimes from a scirrhus, cancer, or some external violence. When the disorder is recent, and occasioned by humours, they may be generally dispersed according to Heister, by bleeding, purging, and vesicatories, with internal attenuants and diluents, and external discutient fomentations. But if the case is too obstinate to yield to remedies, recourse must be had to the surgical operation of the paracentesis, as in other dropical cases. See PARACENTESIS.

At every dressing a concave plate of lead must be firmly secured upon the eye, till it recover its natural figure. After the paracentesis, which our author chooses to do in the sclerotica, rather than the cornea, he dips his compress in spirit of wine. When the eye is infected even to the root with a scirrhus or cancer, there is no safer method of relieving the patient, than by extirpating it clean out of the orbit, detesting and healing the wound in the manner directed under the article WOUND.

PROLAPSUS INTESTINI, or a prolapsion of the intestine. See the articles ENTEROCÉLE and OSCHEOCÉLE.

PROLAPSUS OMENTI, or a falling of the omentum into the scrotum. See the article EPIPLOCELE.

PROLAPSUS UTERI, is when the uterus falls down and appears out of the vagina; whereas when it only descends into the vagina, it is termed a descent, or bearing down of the womb. The apparent and most general cause of a prolapsus uteri is from too great a relaxation and weakness of its ligatures, and of the vagina, and is observed most frequently to follow a difficult labour, or other violent straining, tho' it may sometimes happen even to maids and young girls: as to the other species of this disorder called the descent of the womb, wherein the prolapsed uterus is inverted like a bag, so that its internal surface appears outmost, which at the same times lies concealed in the vagina, it is never observed but when the uterus is forced down together with the secundines, or after a difficult labour; and if it is not speedily reduced, the case soon becomes past cure, and kills the patient. In order to reduce the uterus, after the patient has discharged her urine, she is to be placed in a proper posture, and carefully separating the placenta, if it adheres to the uterus, the latter is to be replaced with the fingers, by returning the pendulous part first with the three middle fingers, and then with the whole hand into the cavity of the abdomen. When the parts have recovered their former situation, the patient is to keep in bed, lying on her back, with her legs close together; and resting in this posture is of itself very often sufficient: however it may not be improper to secure the womb from falling down again, either in coughing, sneezing or otherwise, by retaining the lips of the pudenda together by a proper bandage. If there is an inflammation, bleeding and fomentation of the part with milk and water must be used. This disorder is not so dangerous when the womb appears externally from a relaxation of its ligaments, but without inversion, and not in the time of labour, as it is not likely to be attended with inflammation or mortification; but when it happens in a weak habit, it is often impracticable to sustain it in its proper situation. In this case it must be assisted by a proper bandage, and a retaining instrument internally, such as a pessary, or any other instrument for that purpose. See the article PESSARY.

PROLAPSUS VAGINÆ, or a bearing down of the vagina, is often confounded with the prolapsus uteri, insomuch that they are

are often called by the same name; not being easily distinguishable from each other. Heister takes a prolapsus of the vagina to happen when that body appears either wholly or in part without the labia pudendi; and a total prolapsion shews itself without the relaxed labia like a fleshy ring, red or bloody, and swelled more or less, according to particular circumstances. With regard to the treatment, when it is without inflammation the prolapsed parts should be returned without the least delay, to prevent any inflammation, scirrhus, or gangrene, after being fomented with some astringent and discutient liquor; after which the patient should keep her bed for several days, retaining her thighs close together without moving her body. In some cases it will be proper to heat the patient with some mineral waters of the chalybeate kind, and some preparations of steel; but if the disorder is inveterate, endeavours must be used to palliate it, by ordering the patient constantly to wear the T bandage. See the article BANDAGE.

If the prolapsed parts are inflamed, discutient fomentations and cataplasms are to be applied externally, and bleeding and the other internal medicines directed under the article INFLAMMATION.

PROLAPSUS UVULÆ, a disorder of the uvula, which is sometimes so much enlarged and elongated as even to reach the larynx, and pharynx, and obstruct the actions both of respiration and deglutition. If it proceeds from a recent inflammation, as may be judged from the pain, heat, and redness of the circumjacent parts, the patient may be relieved with cooling gargles, and injections of wine and water, or a decoction of proper herbs with a little alum; but at the same time proper coolers must be used internally, with bleeding, purges, and clysters, to prevent the inflammation from spreading thro' the fauces, and exciting a quinsy. When this disorder continues, notwithstanding the use of remedies, it will be necessary, depressing the tongue with a spatula, to clip off the redundant part of the uvula with a pair of scissars; after which the blood being permitted to run a little time, it may be restrained by a gargle of warm wine, vinegar, or if it still continues, apply a little alum, or a cautery, till the hæmorrhage ceases.

PROLATE, in geometry, an epithet applied to a spheroid produced by the revolution of a semi-ellipses about its lar-

ger diameter. See the articles ELLIPSIS and SPHEROID.

PROLATION, in music, the art of shaking or making several inflections of the voice or sound on the same note or syllable. See the article SINGING.

PROLEGOMENA, in philology, certain preparatory observations, or discourses prefixed to a book, &c. containing something necessary for the reader to be appraised of, to enable him the better to understand the book, or to enter deeper into the science, &c.

PROLEPSIS, *προληψις*, a figure in rhetoric, by which we anticipate or prevent what might be objected by the adversary; thus, *it may be objected*, &c.

PROLEPTIC, *προλεπτικόν*, an epithet applied to a periodical disease which anticipates, or whose paroxysm returns sooner and sooner every time, as is frequently the case in agues.

PROLIFIC, something that has the qualities necessary for generating. See the article FERTILITY.

PROLIXITY, in discourse, the fault of entering into too minute a detail, of being too long, precise, and circumstantial, even to a degree of tediousness.

PROLOCUTOR *of the convocation*, the speaker or chairman of that assembly. See the article CONVOCATION.

There are two prolocutors of the convocation, one of the higher house, and one of the lower: the prolocutor of the lower house, immediately upon their first assembling, is chosen by the members of that house, and presented to the higher house as their prolocutor; that is, the person by whom they intend to deliver their resolutions to the higher house, &c. and to have their own house especially regulated: in which respect his office is to call the names of those that are of the house, as he sees cause, to read all things propounded, gather suffrages, &c. The archbishop of Canterbury is by virtue of his office prolocutor of the higher house of convocation.

PROLOGUE, *prologus*, in dramatic poetry, a discourse addressed to the audience before the drama or play begins. The original intention was to advertise the audience of the subject of the piece, and to prepare them to enter more easily into the action, and sometimes to make an apology for the poet. This last article seems intirely to have taken possession of the prologue in the british drama. The French have left off the use of prologues:

logues: those few they use have nothing in them of the genuine prologue, as bearing no relation to the subject, but being mere flourishes of harangues in praise of the king, &c. In the antient theatre the prologus was properly the actor who rehearsed the prologue: the prologus was esteemed one of the *dramatis personæ*, and never appeared in the piece in any other character: the prologue, therefore, among them, though not an essential, was yet an accessory part of the piece; with us it is no part at all, but something intirely distinct and separate: with them the drama was opened with the appearance of the prologus; with us it is not opened till after the prologus is retired. With us he always directs his speech to the audience, considered as in a play-house; but with them he ought in propriety to have spoken to a chorus of bystanders, or persons to be present at the real action: but this being in a great measure inconsistent with the design of a prologue, it was directed to the audience. The prologue is of much more antient standing than the epilogue. See the article EPILOGUE.

PROLUSION, in literature, a term applied to certain pieces or compositions made previously to others, by way of prelude or exercise: thus Diomedes calls the *Culex* of Virgil, and his other opuscula, *prolusions*, because written before the great ones.

PROM, a city of the kingdom of Ava, in the further India: east long. 94°; north lat. 19°.

PROMETHEUS, in the antient astronomy, the name of the constellation now called hercules. See **HERCULES**.

PROMISE, in law, is when upon any valuable consideration one binds himself by word of mouth to another to perform a thing agreed on. It is held upon such a promise that action will lie for breach, which will not if the promise be without consideration, that being a naked bargain, from which no action can arise. Here a promise against a promise made at one and the same time, is sufficient ground for an action. In case a verbal promise is made to do a thing, and there is no breach thereof, the same may be discharged by parol, or by word of mouth; but if the promise be once broke, it may not be discharged without some receipt or release: for it is then become a debt. When any action is grounded on a promise, there payment or other legal

discharge ought to be pleaded. See the article **BARGAIN**.

PROMONTORY, in geography, a high point of land or rock projecting out into the sea; the extremity of which towards the sea, is called a cape, or headland.

PROMOTERS, *promotores*, in a legal sense, are such as in popular or penal actions prosecute offenders in their own names, and in that of the king's, as informers do; and who have part of the forfeitures or penalties for their reward. These formerly belonged to the exchequer; but of late they have chiefly lifted themselves under the banner of the excise.

PROMPT PAYMENT. See **PAYMENT**.

PROMPTER, in the drama, an officer posted behind the scenes, whose business it is to watch attentively the actors speaking on the stage, in order to suggest and put them forward, when at a stand, to correct them when amiss, &c. in their parts.

PROMULGATED, or **PROMULGED**, something published or proclaimed, and generally applied to a law, to denote the publishing or proclaiming it to the people.

PRONAOS, in the antient architecture, a porch to a church, palace, or other spacious building. See the article **PORCH**.

PRONATION, among anatomists. The radius of the arm has two kinds of motions, the one called pronation; the other supination. Pronation is that whereby the palm of the hand is turned downwards; and supination, the opposite motion thereto, is that whereby the back of the hand is turned downwards. The peculiar muscles whereby pronation is performed are called pronatores, as those by which supination is performed are termed supinatores. See **SUPINATOR**, and the next article.

PRONATORS, *pronatores*, in anatomy, two muscles of the radius, which serve to turn the palm of the hand downwards, and are distinguished by the names of *rotundus* and *quadratus*. The pronator quadratus, or transversus, is a small fleshy muscle, lying transversely on the inside of the lower extremity of the fore arm. It is fixed by one side in the long eminence at the lower part of the internal angle of the ulna, and by the other in the concave side of the lower extremity of the radius. It is nearly as broad as it is long, and is wholly fleshy, without any mixture of tendinous fibres. The pronator

pronator rotundus, or *obliquus*, is a small muscle more broad than thick, situated on the upper part of the ulna, opposite to the *supinator brevis*. It is fixed to the internal condyle of the os humeri, and from thence passes obliquely before the extremity of the tendon of the *brachii*, and reaches to the middle part of the convex side of the radius, where it becomes flat, and is inserted below the *supinator brevis*, by an extremity almost altogether fleshy.

PRONG-HOE, in husbandry, the name of an instrument used to hoe or break the ground near and among the roots of plants. The prong-hoe consists of two hooked points, of six or seven inches length; and when struck into the ground, will stir and remove it the same depth as the plough does; and thus answer both the ends of cutting up the weeds, and opening the land. The prong-hoe comes into excellent use, even in the horse-hoeing husbandry; and in this the hoe-plough can only come within three or four inches of the rows of the corn, turneps, and the like; but this instrument may be used afterwards; and with it the land may be raised and stirred, even to the very stalk of the plant. See the articles **HOE**, **HOEING**, and **PLOUGH**.

PRONOUN, *pronomén*, in grammar, a declinable part of speech, which being put instead of a noun, points out some person, or thing.

Pronouns are divided into the six following classes, *viz.* demonstrative pronouns; relative pronouns; possessive pronouns; gentile pronouns, or such as denote a person's country, as *nostras*, *vestras*, and *cujas*; interrogative pronouns, and reciprocal pronouns. See the articles **DEMONSTRATIVE**, **RELATIVE**, &c.

PRONOUNCING, or **PRONUNCIATION**, in painting, the marking and expressing the parts of all kinds of bodies with that degree of force, necessary to make them more or less distinct and conspicuous.

PRONUNCIATION, *pronunciatio*, in grammar, the manner of articulating or sounding the words of a language.

Pronunciation makes much the most difficult part of a written grammar; in regard that a book expressing itself to the eyes, in a matter that wholly concerns the ears, seems next akin to that of teaching the blind to distinguish colours; hence it is that there is no part so defective in grammar as that of the pronunciation, as the writer has frequently no

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term whereby to give the reader an idea of the sound he would express; for want of a proper term; therefore, he substitutes a vicious and precarious one. To give a just idea of the pronunciation of a language, it seems necessary to fix as nearly as possible all the several sounds employed in the pronunciation of that language. Cicero tells us, that the pronunciation underwent several changes among the Romans; and indeed it is more precarious in the living languages, being, as Du Bos tells us, subservient to fashion in these. The French language is clogged with a difficulty in pronunciation from which most others are free; and it consists in this, that most of their words have two different pronunciations, the one in common prose, the other in verse. See the article **FRENCH**, &c.

As to the pronunciation of the english language, the ingenious Mr. Martin, in his Spelling-Book of Arts and Sciences, lays down the following rules: 1. The final (*e*) lengthens the sound of the foregoing vowel; as in *can*, *cane*; *rob*, *robe*; *tun*, *tune*, &c. 2. The final (*e*) in words ending in *re*, is sounded before the *r* like *u*; as *massacre*, *massa-cur*; *lucre*, *lu-cur*, &c. 3. The latin diphthongs *æ*, *œ*, are sounded like *e*; as *Ætna*, *Etna*; *œconomy*, *economy*, &c. but at the end of words *œ* sounds like *o*; as in *toe*, *fee*, &c. 4. Also the english improper diphthongs, *ea*, *eo*, *eu*, *ue*, sound only the *e* and *u*; as *tea* or *té*, *feoffee* or *seffee*, *due* or *du*, *true* or *tru*, &c. tho' sometimes *eo* and *ea* are pronounced like *ee*, as in *people*, *fear*, *near*, &c. 5. Sometimes the diphthong (*ie*) is pronounced like *e* in *cieling*, like *ee* in *field*, and, at the end of words, always like *y*; as in *lie*, &c. and *ei* is pronounced either like *e* or *ai*; as in *deceit*, *reign*, &c. 6. The triphthong *eau* is pronounced like *o*, in *beau* and *jet d'eau*; and *ieu* sounds like *u* in *lieu*, *adieu*, &c. 7. The sound of *c* is hard before the vowels *a*, *o*, *u*; as in *call*, *cold*, *cup*, &c. also sometimes before *b*, as in *chart*, *chord*, &c. and before *l* and *r*; as in *clear*, *creep*, &c. It is otherwise generally soft, as in *city*, *cell*, *cyder*, *child*, &c. 8. In french words *ch* is sounded like *sh*; as in *chagreen*, *machine*; and sometimes like *qu*, as in *choir*. 9. The sound of *g* is hard before *a*, *o*, *u*, *l*, *r*; as in *gall*, *go*, *gum*, *glean*, *grape*; also before *ui*, as in *guilt*, *guild*, &c. and before *b*, as in *ghost*; sometimes before *i*, as in *gibbous*, *gibberish*. It is

also generally hard before *e*; as in *get*, *geld*, &c. but soft in many words derived from the greek and latin, as in *geometry*, *genealogy*, *genus*, &c. Two *gg* are always hard, as in *dagger*, &c. The sound of *g*, when soft, is like that of *j*. 10. In any part of a word, *ph* sounds like *f*, as in *philosophy*, &c. 11. The sound of *qu*, at the end of french words, is like *k*, as in *risque*, &c. 12. The syllables *ti* and *ci*, if followed by a vowel, sound like *fi* or *shi*; as in *fiction*, *logician*, &c. 13. When *cc* occurs before *i*, the first is hard and the latter is soft; as in *flaccid*, &c. 14. The latter *p* is not pronounced at the beginning of syllables, before *f* and *t*; as in *psalm*, *ptarmics*, &c. As to other peculiarities, regarding the pronunciation of single letters, many of them have been taken notice of at the beginning of each, in the course of this work.

But it is not enough to know the just pronunciation of single letters, but also of words; in order to which, the accenting of words ought to be well understood; since nothing is more harsh and disagreeable to the ear, than to hear a person speak or read with wrong accents: and, indeed, in english, the same word is often both a noun and a verb, distinguished only by the accent, which is on the first syllable of the noun, and on the last of the verb; as *ferment* and *ferment*, *record* and *record*, &c. We are to observe also, that in order to a just expression of words, some require only a single accent on the long syllable; as in *tòrment*, &c. but in others it should be marked double, as in *anìmal*, because it is pronounced as if the letter was wrote double, viz. *annimal*.

PRONUNCIATION is also used for the fifth and last part of rhetoric, which consists in varying and regulating the voice agreeably to the matter and words, so as most effectually to persuade and touch the hearers. It is much the same with what is otherwise called emphasis. See the article EMPHASIS.

This emphasis is a considerable stress or force of voice, laid upon that word in a sentence, by which the sense of the whole is regulated: thus, suppose you were asked, *are you determined to walk this day to London?* If the emphasis be placed on the word *you*, the answer may be, *yes, I go myself*; or *no, I shall send my son*. Again, if it be placed on the word *walk*, the answer is, *yes, I am*; or *no, I shall*

ride: if on the words *to day*, then the answer is, *yes*; or *no, I shall go to morrow*; and, lastly, if the emphasis be placed on the word *London*, the answer may be, *no, I shall go to Richmond only*.

Quintilian advises his pupils to study the principles of pronunciation under a comedian. There are three things which come under the pronunciation, viz. the memory, voice, and gesture. See the articles MEMORY, &c.

PRONUNCIATION, in painting. See the article PRONOUNCING.

PROOF, in arithmetic, an operation whereby the truth and justness of a calculation is examined and ascertained. The proper proof is always by the contrary rule: thus subtraction is the proof of addition, and multiplication of division; and *vice versa*. See the articles ADDITION, SUBTRACTION, &c.

PROOF, in law, &c. denotes the mediums or arguments used to evince the truth of any thing. In law proof is two-fold, viz. *viva voce*, by living witnesses, and *probatio mortua*, a dead proof; such is that of records, deeds, or other writings, Though some have been of opinion, that the law takes no notice of any other proof than that before a jury in a judicial way, and that which is on record; yet if it be agreed by the parties that the proof shall be made in such a manner, or before a particular person, that form is to be observed, and shall prevail against what is usually termed legal proof. In common agreements, &c. a person may bring his action, and therein aver that a certain thing was done, on which the defendant may take issue that the thing was not done, and then the plaintiff at the trial must make proof of the doing it. See the article EVIDENCE.

In the French law, the deposition of one witness, or of a person deceased, makes what they call a semi-proof, or half proof; which in heinous cases, frequently determines them to try the torture. See the article TORTURE.

PROOF is also used in a synonymous sense with standard; thus we call that proof-spirit, which is of the standard strength, or half alcohol half phlegm. See the articles SPIRIT, BRANDY, and DISTILLATION.

PROPAGATION, *propagatio*, the act of multiplying the kind, or of producing the like in the natural way of generation. See the article GENERATION.

PROPER, *proprium*, something naturally and

and essentially belonging to any thing. The schoolmen distinguish four kinds of propers, or modes of propriety: the first called *proprium primo modo*, is what agrees to a single species, but not to all the individuals; the second, *proprium secundo modo*, is what agrees to the whole species, but agrees likewise to one another; the third, *proprium tertio modo*, is what agrees to a single species, but not at all times; and the last and highest, *proprium quarto modo*, is that which alone agrees to one kind, to all the individuals thereof, and at all times.

PROPER, in respect of words, denotes their immediate and peculiar signification; or that directly and peculiarly attached to them; in which sense, the word stands opposed to figurative.

PROPER, in grammar, is also applied to nouns, or names, which are distinguished into proper and appellative. See the article APPELLATIVE.

Man is the appellative, John the proper name.

PROPER FRACTION. See FRACTION.

PROPER, in the civil jurisprudence, is used in opposition to acquired, for an inheritance derived by direct or collateral succession.

PROPERTY, *proprietas*, in a general sense, that which constitutes or denominates a thing proper; or it is a particular virtue or quality which nature has bestowed on some things exclusive of all others: thus colour is a property of light; extension, figure, divisibility, and impenetrability, are properties of body, &c. See the article LIGHT, &c.

PROPERTY, in law, is defined to be the highest right a person has, or can have, to any thing; it being used to denote that right which one has to lands or tenements, goods or chattels, in no respect depending upon another's courtesy. At this day property in lands, &c. is acquired either by entry, descent, law, or conveyance; and in goods and chattels property may be gained divers ways, though generally it is by deed of gift, or bargain and sale.

There are held to be three manner of properties, 1. Absolute property, which is where the proprietor has an absolute power vested in himself to dispose of his estate as he pleases, subject to the laws of the land. 2. Qualified property, as in the case of husband and wife, wherein the husband has only a qualified property in the wife's lands, real chattels,

&c. but in her personal chattels he has an absolute property. 3. Possessory property, as when a person has goods delivered to him to keep, he has such a property therein, that he may maintain actions against strangers who take them out of his possession. It is likewise the same when they are delivered to a carrier, or things are pawned. See the articles PAWN and BROKER.

Every owner of goods has undoubtedly a general property in them; but yet a legatee in a will hath no property in the goods bequeathed him, until such time as they are delivered to him by the executor, so that he has the possession. In the sale of any thing, no property is vested in the buyer till there is an actual delivery. If a person hires a horse for so many days, he hath, during that time, a special property in the beast, and might have an action against even the master of it, did he disturb him in his possession. Where a person borrows or finds another man's goods, or in case one takes them from another, none of these acts will alter the property; though should a person take corn from another, and convert it into malt, or turn timber into a house, &c. in these cases the property becomes altered.

PROPHECY, *προφητεία*, a prediction made by divine inspiration.

Mr. Whiston condemns all allegorical explanation of the prophecies of the Old Testament cited in the New, as weak, enthusiastic, &c. and adds, that if a double sense of the prophecies be allowed, and there be no other method of shewing their completion than by applying them secondarily and typically to our Lord, after having been in their first and primary intention long ago fulfilled in the times of the Old Testament, we lose all the real advantages of the antient prophecies as to the proof of christianity. He therefore sets up a new scheme in opposition thereto: he owns that taking the present text of the Old Testament for genuine, it is impossible to expound the apostles citations of the prophecies of the Old Testament on any other than the allegorical foundation; and therefore to solve the difficulty, he is forced to have recourse to a supposition contrary to the sense of all christian writers before him, viz. that the text of the Old Testament has been greatly corrupted since the apostolical age by the Jews.

Persons pretending to prophecies, are punish-

punishable at common law; by statute, likewise, if any person publish such prophecies with an intent to raise sedition, they shall forfeit 10 l. for the first offence, and suffer a year's imprisonment; and for the second, incur the forfeiture of all their goods, &c.

PROPHET, *προφήτης*, in general, a person who foretells future events, but is particularly applied to such inspired persons among the Jews as were commissioned by God to declare his will and purposes to that people. Among the canonical books of the Old Testament, we have the writings of sixteen prophets, four of which are denominated the greater prophets, *viz.* Isaiah, Jeremiah, Ezekiel, and Daniel, so called from the length or extent of their writings, which exceed those of the others, *viz.* Hoseah, Joel, Amos, Obadiah, Jonas, Micah, Nabum, Habakkuk, Haggai, Zachariah, and Malachi, who are called the lesser prophets from the shortness of their writings. The Jews do not place Daniel among the prophets, because, they say, he lived the life of a courtier rather than that of a prophet. An account of the several writings of the prophets may be seen each under its particular head. See the article **ISAIAH**, &c.

PROPHYLACTICE, *προφυλακτικη*, in medicine, that part thereof which instructs as to the method of preserving health and averting diseases.

PROPITIATION, in theology, a sacrifice offered to God to assuage his wrath, and render him propitious. Among the Jews there were both ordinary and public sacrifices, as holocausts, &c. offered by way of thanksgiving; and extraordinary ones, offered by particular persons guilty of any crime, by way of propitiation. The romish church believe the mass to be a sacrifice of propitiation for the living and the dead. The reformed churches allow of no propitiation but that one offered by Jesus Christ on the cross. Propitiation was also a feast among the Jews, celebrated on the tenth of the month Tisri, in commemoration of the pardon proclaimed to their forefathers by Moses on the part of God, who thereby remitted the punishment due to the crime of their worshipping the golden calf.

PROPITIATORY, or **MERCY-SEAT**, among the Jews, was the cover or lid of the ark of the covenant. See **ARK**. The cherubims spread their wings over the propitiatory.

PROPLASM, is sometimes used for a mould where any metal or soft matter, which will afterwards grow hard, is cast: hence,

PROPLASTICE, the art of making moulds for casting things in.

PROPOLIS, the name of a certain substance more glutinous and tenacious than wax, with which the bees stop up all the holes or cracks in the sides of their hives. Besides the wax and the honey which the bees gather in their daily travels, they have occasion for this third substance at times, and that especially when they are placed in a new hive. They not only stop in this manner all the cracks they can find, but even examine all the weak places of the hive, and will eat away a rotten part, to make up the deficiency with this propolis. It appears from the observations of Reaumur, that the propolis is a substance perfectly different from wax, and is a true genuine vegetable resin, of a brownish-red colour on the surface, and when broken, approaching to the colour of wax, carried home by the bees in lumps in the same manner in which they carry their wax. The apothecaries in some places keep this as a medicine in their shops. It readily dissolves in spirit of wine, or oil of turpentine: this solution is of a fine gold-colour, and will serve as a varnish to colour silvered picture-frames, or the like work.

PROPONTIS, or *sea of MARMORA*, divides Europe from Asia, having the Bosphorus on the north-east, by which it has a communication with the Euxine sea, and the Hellespont on the south-west, by which it communicates with the Archipelago. It is one hundred and twenty miles long, and in some places upwards of forty broad.

PROPORTION. When two quantities are compared one with another, in respect of their greatness or smallness, the comparison is called ratio, reason, rate, or proportion: but when more than two quantities are compared, then the comparison is more usually called the proportion that they have to one another. The words ratio and proportion are frequently used promiscuously.

When two quantities only are compared, the former term is called the antecedent, and the latter the consequent.

The relation of two homogeneous quantities one to another, may be considered either, 1. By how much the one exceeds

ceeds the other, which is called their difference. Thus 5 exceeds 3 by the difference 2. Or, 2. What part or parts one is of another, which is called ratio. Thus the ratio of 6 to 3 is $\frac{6}{3} = \frac{2}{1}$, or double; and the ratio of 3 to 6 is $\frac{3}{6} = \frac{1}{2}$, or subduple.

When two differences are equal, the terms that compose them are said to be arithmetically proportional. Thus suppose the term to be a and b , their difference d . If a be the least term, then $a + d = b$. And if a be the greatest, then $a - d = b$.

But when two ratios are equal, the terms that compose them are said to be geometrically proportional. For suppose a and b to be the terms of any ratio; if a be the least term, put $r = \frac{b}{a}$, then $ar = b$

by equal multiplication; but if b be the least term, put $r = \frac{a}{b}$, then $br = a$ by

equal multiplication, and $\frac{a}{r} = b$ by equal division.

Thus the ratio of two quantities, or of two numbers, in geometrical proportion, is found by dividing the antecedent by the consequent, and the quotient is the exponent or denominator of the ratio.

Proportions, so many of them as are rational, or between number and number, have particular names given them by the greek and latin writers. Thus, if after the antecedent be divided by the consequent, the quotient be 1, it is called proportion of equality, or simple proportion. If the quotient be 2, 3, 4, (or any other integral number) it is called multiple proportion (*viz.* double, triple, quadruple, &c.) and the contrary to those are called sub-multiple, (*viz.* sub-duple, sub-triple, sub-quadruple, &c.) or one half, one third, one fourth, or other such aliquot part.

If the quotient be 1, with one such part, as $1\frac{1}{2}$, $1\frac{1}{3}$, $1\frac{1}{4}$, &c. it is called superparticular (*viz.* sesquialteral, sesquitercian, sesquiquartan, &c.) and the contraries hereunto are called sub-superparticular (*viz.* sub-sesquialteral, sub sesquitercian, &c.)

If such quotient be 2, 3, 4, (or such other integer greater than unity) with such an aliquot part it is called multiple-superparticular (as $2\frac{1}{2}$ duple-sesquialteral, $3\frac{1}{3}$ triple-sesquitercian, $3\frac{1}{4}$ triple-sesquiquartan, &c.) and the contraries

thereunto are sub-multiple-superparticular, as subduple-sesquialteral, subtriple-sesquitercian, &c.

If the quotient be 1, with some number of aliquot parts, as $1\frac{2}{3}$, $1\frac{3}{4}$, $1\frac{2}{5}$, &c. it is called superpartient, (as superbipartiens tertias, super-tripartiens quartas, superbipartiens quintas, &c.) and the contraries hereunto are sub superpartient, as sub-superbipartiens tertias, &c.

If such quotient be some greater integer number, (as 2, 3, &c.) with such number of aliquot parts, as $2\frac{2}{3}$, $3\frac{3}{4}$, $3\frac{2}{5}$, &c. it is called multiple-superpartient, (as dupla-superbipartiens tertias, tripla-supertripartiens quartas, tripla-supertripartiens quintas, &c.) And the contraries thereunto, submultiple-superpartient, (as subdupla-superbipartiens tertias, subtripla-supertripartiens quartas, &c.) as that of 31 to 7 (because $\frac{31}{7} = 4\frac{3}{7}$) is quadruple-supertripartiens septimas; and its contrary, 7 to 31, is sub-quadruple-supertripartiens septimas. And under some of these compellations all proportions will fall, which are as one integer number to another.

But it is much better, and more intelligible, to express these proportions, as the usual manner now is, by the numbers themselves, than by these names, as 31 to 7, or 7 to 31.

If when four quantities are considered, you find that the first hath as much greatness or smallness in respect to the second, as the third hath in respect to the fourth: those four quantities are called proportionals, and are thus expressed.

As $\left\{ \frac{A : B :: C : D}{8 : 2 :: 16 : 4} \right\}$ that is, as $A = 8$

contains $B = 2$ four times, so $C = 16$ contains $D = 4$ four times; and therefore A has the same ratio to B , as C has to D ; and consequently, these four quantities having equal ratios, are proportionals.

Proportion consists of three terms at least, whereof the second supplies the place of two.

When three magnitudes, A , B , C , are proportional, the first A has a duplicate ratio to the third C , of that it hath to the second B : but when four magnitudes, A , B , C , D , are proportional, the first A has a triplicate ratio to the fourth D , of what it has to the second B ; and so always in order one more, as the proportion shall be extended.

Duplicate ratio is thus expressed, $\frac{A}{C} = \frac{A}{B}$ twice; that is, the ratio of A to C is duplicate

Fig 1. PROSTIAPHÆRESIS.

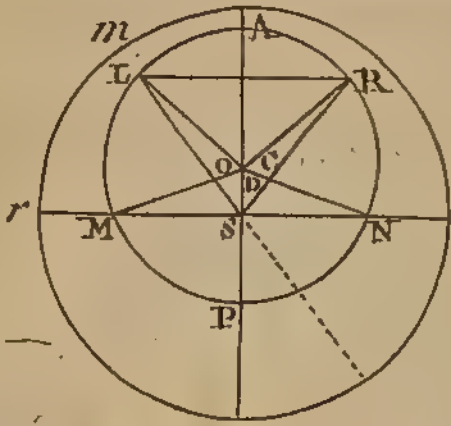


Fig 2. PROJECTION.

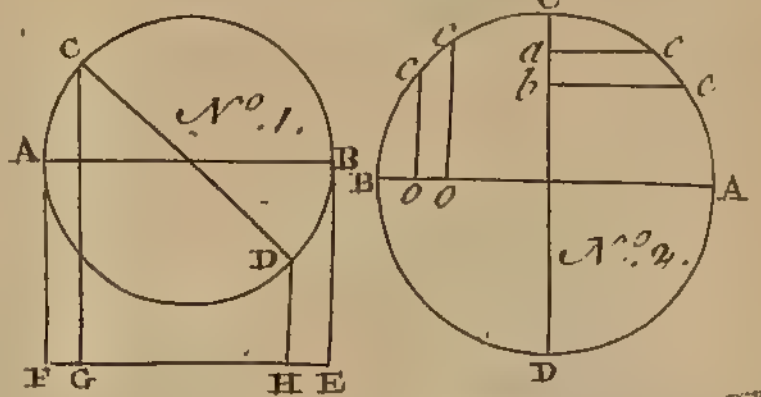


Fig 3. PROJECTILES.

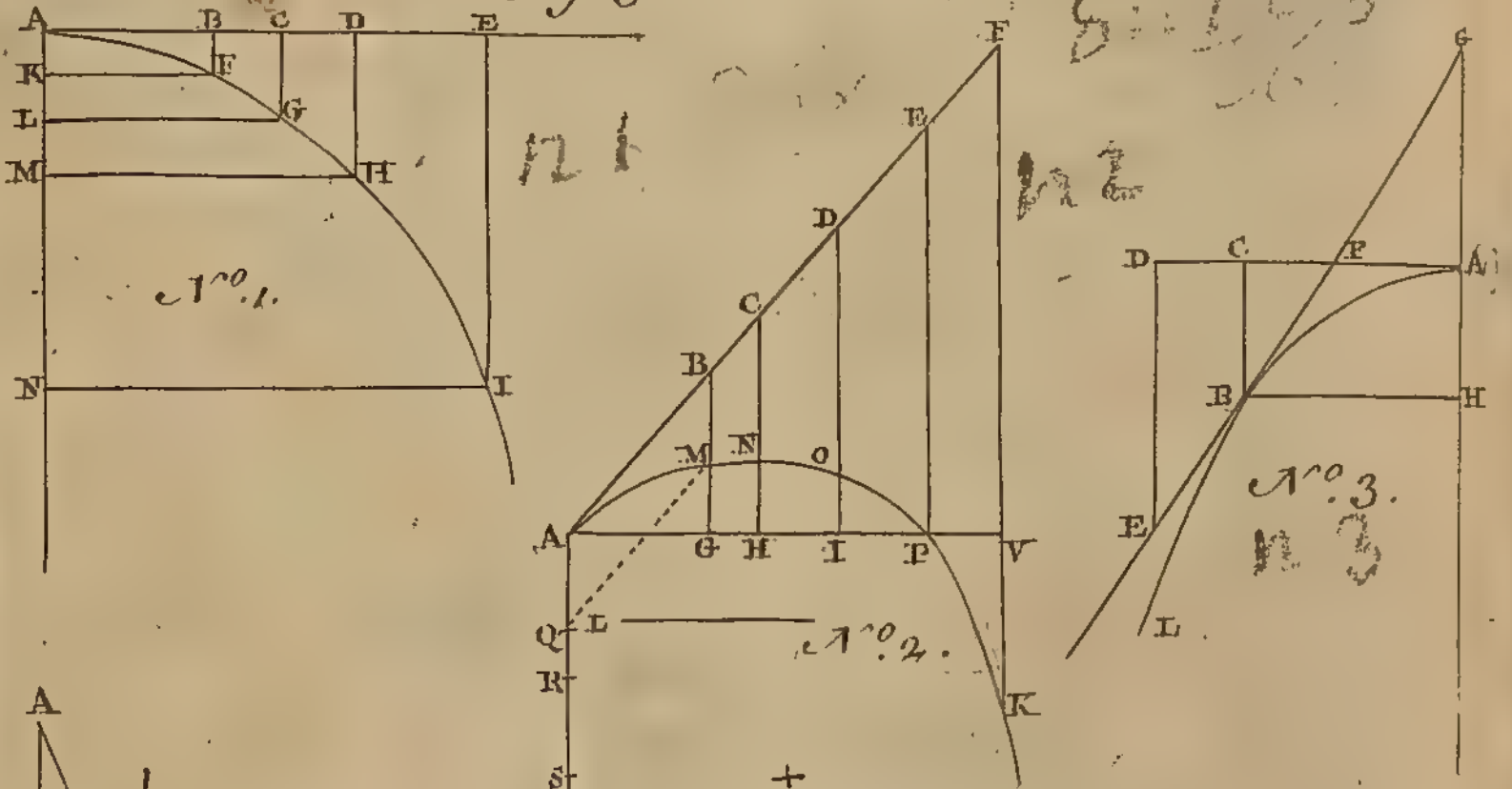
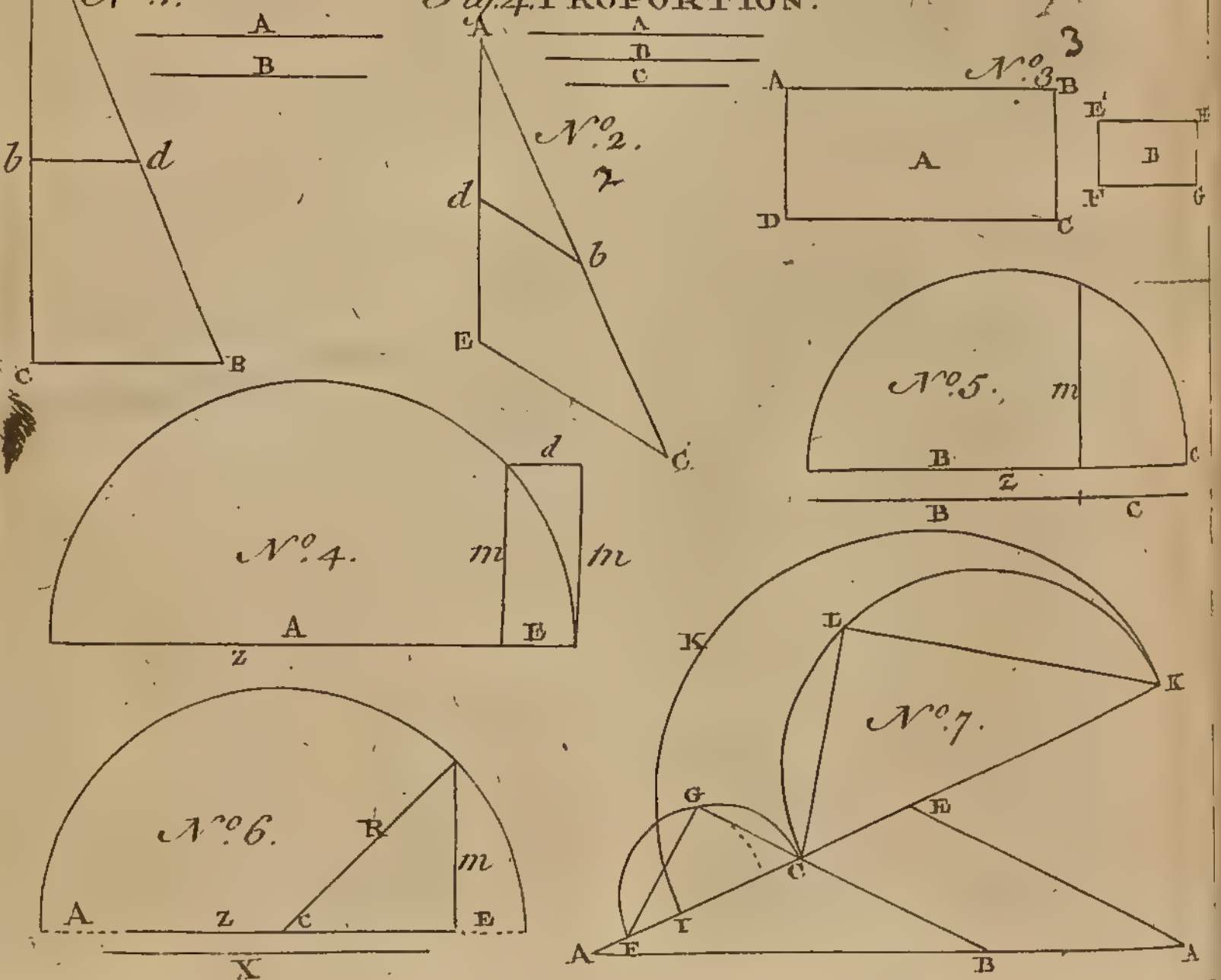


Fig 4. PROPORTION.



portionals, whose common difference is d .

$$\text{And } \left\{ \begin{array}{l} a, ar, arr, arrr, arrrr, ar^5 \\ a, \frac{a}{r}, \frac{a}{rr}, \frac{a}{rrr}, \frac{a}{rrrr}, \frac{a}{r^5} \end{array} \right\}$$

&c. is a series of continued geometric proportionals, whose common multiplier is $\frac{r}{1}$ or $\frac{1}{r}$, or whose ratio is that of 1 to r , or r to 1.

Note, that the sign \div , signifies continued proportion.

Again, when of several quantities the difference or quotient of the 1st and 2d is the same with that of the 3d and 4th (and not of the 2d and 3d) they are said to be in a discontinued arithmetic, or geometric proportion; such as

$$1. \left\{ \begin{array}{l} a, a+d; e, e+d \\ a+d, a; e+d, e \end{array} \right\} \div \left\{ \begin{array}{l} a+d-a=e+d-e \\ =d \end{array} \right\}$$

$$2. \left\{ \begin{array}{l} a, ar; e, er \\ ar, a; er, e \end{array} \right\} \text{ for } \left\{ \begin{array}{l} \frac{a}{ar} = \frac{e}{er} = \frac{1}{r} \\ \frac{ar}{a} = \frac{er}{e} = r \end{array} \right\}$$

Problem I. To two lines A and B, to find a third proportional D (plate CCXIII. fig. 4. n^o 1.) make any right-lined angle, as CAB, then set off in AB, $Ad=A$, and on AC, $ab=B$. Set off also $dB=B$ on AB; then join bd , and through B draw a line parallel to bd , so shall bC be the third proportional required, for $A : B :: B : D$ by 2, 6, Eucl.

Prob. II. To three given lines A, B, and C, to find a fourth proportional D. Make any angle, CAE (*ibid.* n^o 2.); then from A take $Ab=A$, and $bC=B$, and $Ad=C$; join bd , and through C draw CE parallel to bd ; so shall dE be the line sought; for $A : B :: C : D$. 2, 6, Euclid.

PROPORTION of figures. Prob. I. To find the proportion that one rectangle hath to another, both length and breadth must be considered. For rectangles are to each other, as the products of their respective lengths multiplied by their breadths.

1. Thus, if there be two rectangles, the former of which hath its length five feet, and its breadth three; and the latter hath its length eight feet, and its breadth four. Then the rectangles will be to each other as $3 \times 5 (=15)$, is to $4 \times 8 (=32)$ that is, as 15 : 32, so that all the rectangles are to one another in a ratio compounded of that of their sides.

2. When rectangles have their sides proportionable, so that $\frac{AB}{8} :: \frac{EH}{4} :: \frac{AD}{4}$

$\frac{EF}{2}$, then is the rectangle A, (n^o 3.) to the rectangle B, in a duplicate proportion to the ratio of the sides.

For the ratio of A to B, is compounded of the ratio of AB to EH, and of the ratio of AD to EF. And therefore the proportion of A to B, being compounded of equal ratios, must be duplicate of the ratio of their sides to each other; that is, duplicate of the ratio of AB : EH, or of AD : EF.

Hence all triangles, parallelograms, prisms, parallelopipeds, pyramids, cones, and cylinders, are to one another respectively compared, in a proportion compounded of that of their heights and bases.

3. All triangles, and parallelograms, pyramids, prisms, and parallelopipeds; also all cones, and cylinders, each kind compared among themselves; if they have equal altitudes, are in the same proportion as their bases; if they have equal bases, are as their heights.

For the bases, or heights, will severally be common efficient or multipliers; and therefore must make the products be in the same proportion as the multiplicand was before.

Thus, if the equal altitude of any two triangles, parallelopipeds, cones, &c. be called A, and their unequal bases B, and D: then it will be as $B : D :: AB : AD$.

This problem being of great use, ought to be placed among the elements of geometry.

Case I. To find two right-lines, whose sum or difference is given, reciprocally proportional to two given lines. Let the two given lines be B and C, and let the sum of the two lines sought be Z: it is required to find a point where Z may be so divided, as that $B : A :: E : C$. (no 4.)

First find m , a mean proportional between B and C, which erect perpendicularly at either end of Z, (n^o 5.) draw D parallel to Z, describe a semi-circle upon Z, and where D cuts that semi-circle, let fall m perpendicularly: then I say A and E are the lines required; for $AE=m^2=BC$. Q. E. D.

Case II. When the difference = X is given, (n^o 6.) find m a mean proportional as before, which erect perpendicularly at either end of X: thus draw R from the middle point of X to M, and with that as radius describe a semi-circle

circle on the center C: so shall A + X be the greater line, and E the lesser sought, for $A + X \times E = m^2 = BC$. Q. E. D.

Prob. II. Having two squares, to find two others reciprocally proportional, whose sum is equal to a given square.

Let the squares given be bb , cc , and the reciprocals required yy and $dd-yy$, then,

$$\begin{aligned} yy : bb : cc : dd-yy \\ ddy y - y^4 = b b c c \\ y^4 - d d y y + \frac{1}{4} d^4 = \frac{1}{4} d^4 - b b c c \\ \frac{1}{2} d^2 - y^2 = \sqrt{\frac{1}{4} d^4 - b b c c} \\ y^2 = \frac{1}{2} d^2 - \sqrt{\frac{1}{4} d^4 - b b c c} \\ y = \sqrt{\frac{1}{2} d^2 - \sqrt{\frac{1}{4} d^4 - b b c c}} \end{aligned}$$

The construction of this is as follows. Let AB (n^o 7.) = d , and AC = b , and BD = c , find a fourth proportional, as

$CE = \frac{bc}{d}$, and on CF = $\frac{1}{2} d$ describe a semi-circle, and in it apply CG = CE, then FG will be equal $\frac{\sqrt{\frac{1}{4} d^4 - b^2 c^2}}{d}$

Let HC = d , and CI = $\frac{1}{2} d - \sqrt{\frac{1}{4} d^4 - b^2 c^2}$, the mean proportional will be CK = y , and on CH = d describe a semi-circle, and in it apply CL = CK, then LH = $\sqrt{d^2 - y^2}$, which is the side of the other square sought.

Prob. III. Having two squares, to find two other reciprocals whose difference shall be equal to a given square.

Let the squares given be ff , gg , and the reciprocals sought yy and $bb+yy$, then,

$$\begin{aligned} yy : ff : gg : bb + yy \\ y^4 + b b y y = f f g g \\ y^4 + b b y y + \frac{1}{4} b^4 = f f g g + \frac{1}{4} b^4 \\ y^2 + \frac{1}{2} b^2 = \sqrt{f f g g + \frac{1}{4} b^4} \\ y^2 = \sqrt{f f g g + \frac{1}{4} b^4} - \frac{1}{2} b^2 \\ y = \sqrt{\sqrt{f f g g + \frac{1}{4} b^4} - \frac{1}{2} b^2} \end{aligned}$$

The construction of this is almost the same as in the preceding problem.

Of the proportion of solids, every parallelopiped, is to a pyramid of the same base and height, as 3 to 1, that is, the one is triple the other.

A cylinder, spheroid, and cone, of the same base and height, are as 3, 2, and 1.

Harmonic PROPORTION, is when three terms are so disposed, that as the diff. of the first and second : the diff. of the second and third :: first : third; and they are said to be harmonically proportional. Thus, 10, 15, 30, are harmonically

proportional. For as the diff. of 10 and 15, is to the diff. of 15 and 30, so is 10 to 30. Also 12, 6, 4, are harmonically proportional; for $12 - 6 : 6 - 4 :: 12 : 4$. So $b^2 + 3 b n + 2 n^2$, $b^2 + 2 b n$, $b^2 + b n$, are harmonically proportional. For $b n + 2 n^2 : b n :: b^2 + 3 b n + 2 n^2 : b^2 + b n$. Whence if the two first terms of an harmonic proportion be given, the third is readily found.

For if A, B, C, be harmonically proportional. Then $A - B : B - C :: A : C$, and $AC - BC = AB - AC$. Therefore $AB = 2A - B \times C$, and $BC = 2C - B \times A$.

Consequently $C = \frac{AB}{2A - B}$, and

$A = \frac{BC}{2C - B}$. Again, when four terms

are so disposed, that as the diff. of the 1st and 2d : the diff. of the 3d and 4th :: 1st : 4th they are also harmonically proportional. As 10, 16, 24, 60; for as $10 - 16 : 24 - 60 :: 10 : 60$. Whence if the three first terms of such an harmonic proportional be given, the 4th is easily found.

For if a, b, c, d , be harmonic proportionals, then $a - b : c - d :: a : d$; and $ad - bd = ac - ad$, therefore

$$d = \frac{ac}{2a - b}, \text{ and } a = \frac{bd}{2d - c}$$

If the terms of an harmonic proportion be continued, then it is called an harmonic progression. Thus, supposing b , to be the 2d term, d , the difference of the 1st and 2d and that the 1st exceeds the 2d. The progression will be.

$$b + d, b, \frac{b^2 + bd}{b + 2d}, \frac{b^2 + bd}{b + 3d}, \frac{b^2 + bd}{b + 4d}, \frac{b^2 + bd}{b + 5d}, \text{ \&c.}$$

Whence, if out of a rank of harmonic proportionals, there be taken any series of equidistant terms, that series will be harmonically proportional. And this kind of proportion has several other properties common with arithmetic and geometric proportions.

When three terms are so disposed, that the diff. of the 1st and 2d : diff. of the 2d and 3d :: 3d : 1st, they are said to be in a contra-harmonic proportion. Thus, 6, 5, 3, and 12, 10, 4, are contra-harmonics. For $6 - 5 : 5 - 3 :: 3 : 6$; and $12 - 10 : 10 - 4 :: 4 : 12$. Or, supposing b greater than n , if the 2d term be greater than the 1st :

Then $b^2n + n^2$, $b^2 + n^2$, $b^2 + bn$, are contra-harmonics, for $bn - b^2 : n^2 - bn :: b^2 + bn : bn + n^2$.

But if the 1st term exceeds the 2d, then, $b^2 + bn$, $b^2 + n^2$, $bn + n^2$, are contra-harmonics. For $bn^2 - n^2 : b^2 - bn :: bn + n^2 : b^2 + bn$.

PROPOSITION, *propositio*, in logic, part of an argument wherein some quality, either negative or positive, is attributed to a subject, or, according to Chauvinus, it is a complete consistent sentence, indicating or expressing something either true or false, without ambiguity; as God is just.

While the comparing of our ideas is considered merely as the act of the mind, assembling them together, and joining or disjoining them according to the result of its perceptions, this operation is called judgment. See **IDEA** and **JUDGMENT**. But when these judgments are expressed in words, they then bear the name of propositions. Hence a proposition is a sentence expressing some judgment of the mind, whereby two or more ideas are affirmed to agree or disagree; and as our judgments include at least two ideas, one of which is affirmed or denied of the other; so a proposition must have terms corresponding to these ideas. The idea of which we affirm or deny, and of course the term expressing that idea, is called the subject of the proposition; and the idea affirmed or denied, as also the term answering to it, is called its predicate; thus in the proposition, God is omnipotent, God is the subject, it being of him that we affirm omnipotence; and omnipotent is the predicate, because we affirm the idea expressed by that word to belong to God. See the articles **SUBJECT** and **PREDICATE**.

But as in propositions ideas are either joined or disjoined, it is not enough to have terms expressing those ideas, unless we have also some words to denote their agreement or disagreement. Now that word which connects in this manner the subject and predicate of a proposition, is called the copula; and if a negative particle be annexed, we thereby understand that the ideas are disjoined. The substantive verb is commonly made use of for the copula, as in the above-mentioned proposition, "God is omnipotent;" where the word *is* expresses the copula, and signifies the agreement of the two ideas, God and omnipotence; but if we mean to separate two ideas, then, be-

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sides the substantive-verb, we must also use some particle of negation to express this repugnance: the proposition, "Man is not perfect," may serve as an example of this kind; where the notion of perfection being removed from the idea of man, the negative particle *not*, is inserted after the copula, to signify the disagreement between the subject and predicate. The schoolmen call the two terms, *viz.* the subject and predicate, the matter; and the copula, the form of a proposition.

When the mind joins two ideas, the proposition expressing this judgment is termed affirmative; as, "a stone is heavy;" and, on the contrary, when the mind separates two or more ideas, the proposition expressing this judgment is called negative; as, "God is not the author of evil."

Now as terms may be either singular, or common and universal; if the subject of a proposition be a common term taken in all its extent, the proposition is called universal; as, "every man is mortal."

If the common term be taken in an indeterminate part of its extent, the proposition is called particular; as, "some men are virtuous." If the subject of the proposition be singular, the proposition is called singular; as, "Aristotle is the prince of philosophers." Those propositions which have only one subject and one attribute, are called simple; those that have several subjects, or attributes, are called compound. See **TERM**, **SUBJECT**, **PREDICATE**, &c.

A syllogism consists of three propositions, *viz.* the major, minor, and conclusion; an enthymeme, of two. See the articles **SYLLOGISM** and **ENTHYMEME**.

The schoolmen make several other species and divisions of propositions, as a proposition *de primo adjacente*, where the subject and predicate are both included under the verb, as *veni, vidi, vici*: a proposition *de secundo adjacente*, is where either the subject or predicate is included in the verb; as, "Peter writes, I read;" a proposition *de tertio adjacente*, is where both the subject and predicate are expressed, and stand distinct from the verb, as "the mind is a substance." This proposition is the rule or standard of all the others, so that whatever proposition can be reduced thereto is legitimate; and what cannot, is not legitimate.

Propositions are again divided into three classes; the first, regarding the matter; the

the second, the form; and the third, the thought: those of the first class are subdivided into finite and infinite, direct and indirect, single and manifold. Finite or definite proposition, is that which declares something determinate on a subject, as, "man is not a stone." Infinite or indefinite proposition, is that where either one or both of the terms are infinite, or have a negative prefixed to them, as, *non-homo est albus, homo est non albus, non-homo est non-albus*. Direct proposition is that wherein a higher or more general thing is predicated of a lower and more particular, as, "man is an animal." Indirect proposition, is that wherein an inferior is predicated of an higher, as "an animal is man." Single proposition, is that either singly or by conjunction: it is singly such when it affirms or denies one thing of one other thing, as "man is an animal:" by conjunction, when several propositions are joined and coupled together, thus, "the sun shines and it is day," are two propositions, which conjoined make this one, "if the sun shines it is day."

Of such conjunct propositions there are divers kinds, *viz.* hypothetical, disjunctive, copulative, &c. Hypothetical proposition, is that which consists of several simple ones affected with some conditional one, as "if the sun be set it is night." For the disjunctive, copulative, &c. see the articles DISJUNCTIVE, COPULATIVE, &c.

Compound proposition, is that where one or both the terms excite several ideas in the mind, as "a man is body and soul, and both together." Manifold proposition is that consisting of several subjects, as "Peter and Paul preached:" or of several predicates, as "Peter and Paul preach and pray."

In respect of form, propositions are divided into affirmative and negative, true and false, pure and modal. Affirmative proposition is that whose attribute is joined to the subject, "God is a spirit." A negative proposition is that whose attribute is separated from the subject, as "man is not a stone." True proposition is that which declares a thing to be what it really is; and a false proposition is that, which signifies a thing to be what it is not. The truth of a proposition therefore depends on the connecting of the subject with the attribute, which is done by that act of the mind called judgment. Propositions are said

to be pure when they imply or involve nothing besides their matter and form. Modal proposition is that which, besides the pure matter and form, involves some mode or manner of disposition. See the article MODE.

To modal propositions the philosophers refer exclusive, exceptive, and restrictive propositions. See the article EXCLUSIVE, &c.

For complex propositions, &c. see the article COMPLEX, &c.

PROPOSITION, in mathematics, is either some truth advanced and shewn to be such by demonstration, or some operation proposed and its solution shewn. If the proposition be deduced from several theoretical definitions compared together, it is called a theorem; if from a praxis, or series of operations, it is called a problem. See the articles THEOREM and PROBLEM.

PROPOSITION, in poetry, the first part of a poem wherein the author proposes briefly, and in general, what he is to say in the body of his work. It should comprehend only the matter of the poem, that is the action and the persons that act. Horace prescribes modesty and simplicity in the proposition, and would not have the poet promise too much, nor raise in the reader too great ideas of what he is going to relate.

PROPREFECT, *propræfectus*, among the Romans, the prefect's lieutenant, or an officer whom the prefect of the pretorium commissioned to do any part of his duty in his place. See the article PREFECT.

PRORETOR, a Roman magistrate, who, having discharged the office of pretor at home, was sent into a province to command there with his former pretorial authority. It was also an appellation given to those who, without having been pretors at Rome, were sent extraordinarily into the provinces to administer justice with the authority of pretors.

PROPRIETATE, PROBANDA, in law, a writ directed to the sheriff, to make enquiry into the property of goods distrained, when the defendant claims it on a replevin sued; and if thereon it be found for the defendant, he can proceed no farther.

PROPRIETATIS ELIXIR, in pharmacy, an elixir, the preparation of which the London-dispensatory directs as follows: take of choice myrrh, of the best aloes, and of saffron, each three ounces: when they are powdered, pour upon them a quart

quart of rectified spirit of wine; digest them four days to an extraction of the tincture, which pour off: to the remainder pour on more spirit of wine; digest and pour off as before, and afterwards draw away some of the spirit by distillation: it is made acid by an addition of the spirit of sulphur, any quantity at discretion. This may be given from ten to thirty drops to children, and to grown persons from twenty to sixty, or more. It is particularly good in pale wan complexions, and will itself frequently cure the green sickness; but in hot, florid constitutions, it does not so well, especially in those subject to the gravel. It is accounted very good to destroy worms in children, if taken twice or thrice a day for two or three weeks together. See the article ELIXIR.

PROPRIETOR, or **PROPRIETARY**, he who has the property of any thing. See the article PROPERTY.

PROPRIETY, in grammar, is where the direct and immediate signification of a word agrees to the thing it is applied to; in which sense, it is used in opposition to figurative, or remote signification.

PROQUESTOR, *proquestor*, the questor's lieutenant, or a person who discharged the office of questor in his stead. See the article QUESTOR.

PRO RATA, in commerce, a term sometimes used by merchants for, in proportion; as each person must reap the profit or sustain the loss pro rata to his interest, that is, in proportion to his stock.

PRO RATA PORTIONIS, in law. See **ONERANDA PRO RATA PORTIONIS**.

PRORÆ OS, in anatomy, the same with **OS OCCIPITIS**. See **OCCIPITIS OS**.

PROROGANDA ASSISA. See **ASSISA**.

PROROGATION, *prorogatio*, the act of prolonging, adjourning, or putting off to another time. The difference between a prorogation and an adjournment of parliament is, that by prorogation the session is ended, and such bills as passed in either house, or both houses, and had not the royal assent, must, at the next assembly, begin again; because that every session of parliament is in law a several parliament: whereas, if the parliament be only adjourned, there is no new session, and consequently all things continue in the same state they were in before the adjournment. See the articles **ADJOURNMENT** and **PARLIAMENT**.

PROSCRIPTION, *proscriptio*, a publication made in the name of the chief or leader of a party, whereby he promises a reward to any one who shall bring him the head of one of his enemies.

PROSE, *prosa*, the natural language of mankind, loose and unconfined, by poetical measures, rhymes, &c. in which sense it stands opposed to verse. See the article **VERSE**.

PROSECUTION. To make men liable to criminal prosecutions by the law of England, it is required, that they have the use of reason, and that they be *sui juris*. On the first account, the law indulges infants under the age of discretion, idiots, and lunatics, whatever the nature of the fact may be; and even against the person of the king, as it has been held of late; neither will it suffer one who becomes *non compos* after he has committed a capital offence, to be either arraigned or executed. See the articles **LUNATIC**, **INFANT**, and **IDIOT**.

PROSECUTOR, in law, he that pursues a cause in another's name.

PROSELYTE, a new convert to some religion or religious sect. See **CONVERT**.

PROSERPINACA, in botany, a genus of the triandria-trigynia class of plants, the calyx of which is a perianthium divided into three segments, and placed on the germen; the leaves are erect, acuminate and permanent; there is no corolla, nor pericarpium; the seed is single, fleshy, oval, and shut up in the cup.

PROSODY, *profodia*, that part of grammar which treats of the quantities and accents of syllables, and the manner of making verses. See **GRAMMAR**, **QUANTITY**, **ACCENT**, and **VERSE**.

The english prosody turns chiefly on two things, numbers, and rhyme.

PROSONOMASIA, *προσωνομασια*, a figure in rhetoric, whereby allusion is made to the likeness of a sound in several names or words.

PROSOPOPOEIA, *προσωποποιεα*, a figure in rhetoric, whereby we raise qualities, or things inanimate, into persons. This figure is divided into two parts: 1. when good and bad qualities, accidents, and things inanimate, are introduced as living and rational beings; as in the following verses of Milton:

----- Now gentle gales,
Fanning their odoriferous wings, dispense
15 H 2 Native

Native perfumes; and whisper whence
they stole

Those balmy spoils.-----

The second part of this figure is when
we give a voice to inanimate things, and
make rocks, woods, rivers, buildings,
&c. express the passions of rational
creatures, as in the following lines of
Spencer.

She foul blasphemous speeches forth did
cast,

And bitter curses, horrible to tell,

That ev'n the temple wherein she was
plac'd,

Did quake to hear, and nigh asunder
burst!

PROSTATÆ, in anatomy, a gland, ge-
nerally supposed to be two separate bo-
dies, though in reality but one, of a
roundish, or somewhat heart-fashioned
shape, situated just before the neck of
the bladder, and surrounding the begin-
ning of the urethra. The size of this
body is about that of a walnut: it has
two prominences, of a round figure in
its hinder part, called prominentiæ nati-
formes: its eminence, called the caput
gallinaginis, is in the urethra, and has
two orifices, which are common to the
vesiculæ seminales and the ejaculatory
ducts; and frequently there is a little
sinus between these. The substance of
the prostatæ is glandulous and cavernous;
it is very robust, and surrounded with a
strong membrane; the foraminula, or
excretory ducts of this gland, discharge
from the little cells within it, a thin
white fluid. In the human body there
are ten or twelve of them; in dogs they
are more numerous. The vessels of the
prostatæ are common with the vasiculæ
feminales.

The use of the prostatæ is to secrete a
fluid which, because it is ejected in co-
ition, some have imagined to be of use
in generation: but according to Heister,
it seems only destined to lubricate the
urethra, and be a kind of vehicle to the
semen, which is too thick otherwise to
pass with the necessary ease.

PROSTHAPHÆRESIS, *προσθαφαρησις*, in
astronomy, the difference between the
true and mean motion, or true and mean
place, of a planet, called also equation
of the orbit, or of the center, and simply
equation.

Prosthaphæresis amounts to the difference
between the mean and equated anomaly.
Suppose the circle A L M P N R (plate
CCXIII, fig. 1.) the orbit of the earth

surrounded by the ecliptic $\gamma \delta \epsilon \zeta$,
&c. and suppose S the sun, and the earth
in R, the mean anomaly will be the
arch A P R, or, casting away the semi-
circle, the arch R P or the angle P C R;
and the true anomaly, rejecting the semi-
circle, will be P S R, which is equal to
P C R + C R S. If then to the mean
anomaly we add the angle C R S, we
shall have the true anomaly P S R, and
the earth's place in the ecliptic. And
here the angle C L S, or C R S, is called
the prosthaphæresis; by reason that it is
sometimes to be added and sometimes
subtracted from the mean motion, that
we may have the true motion, or place
of the earth.

PROSTHESIS, in grammar, the prefixing
some letter or syllable at the beginning
of a word, as in *gnatus*, for *natus*, &c.

PROSTHESIS, among surgeons, is the
supplying that which is deficient by
the apposition of new matter, as the fil-
ling up ulcers, wounds, &c. with new
flesh.

PROSTYLE, in antient architecture, a
range of columns in the front of a temple.

PROSYLLOGISM, in the schools, some-
times denotes an argument produced to
confirm one of the premisses of a syllo-
gism. Others define it an argument
composed of two syllogisms, so disposed as
that the conclusion of the former is the
major or minor of the latter; so that the
second syllogism may be omitted or un-
derstood. See the article SYLLOGISM.

PROTASIS, in the antient drama, the
first part of a comic or tragic piece,
wherein the several persons are shewn,
their characters intimated, and the subject
of the piece proposed and entered upon.
See the article DRAMA.

It might reach as far as our two first acts,
and where it ended the epitasis com-
menced. See the article EPITASIS.

PROTATICUS, in the antient drama, a
person who never appeared but in the
protasis, or first part of the play.

PROTEA, *narrow-leaved* SILVER-TREE,
in botany, a genus of the tetrandria-mo-
nogynia class of plants, with a uniform
compound flower, the peculiar corollæ of
which are monopetalous, and divided
into four segments at the limb: the seeds
are contained in the cup, *viz.* a single
seed succeeding each peculiar corolla.

PROTECTION, the shelter, defence, au-
thority, and aid employed by any one
in behalf of another.

Protection, in law, in its general sense,
denotes

denotes the safety every subject, denizen, and alien enjoys from the laws; and in a more special sense, it is used for an exemption or immunity given by the king to a person for a time, to secure him against suits at law, or other vexations. Protection is also used for a privilege belonging to embassadors, members of parliament, &c. whereby they and their servants are secured from arrests, &c.

PROTECTOR, a person who undertakes to shelter and defend the weak, helpless and distressed.

Every catholic nation and every religious order, has a protector residing at the court of Rome, who is a cardinal, and is called the cardinal protector.

Protector is also sometimes used for a regent of a kingdom, made choice of to govern it during the minority of a prince.

Cromwell assumed the title and quality of lord protector of the commonwealth of England, &c.

PROTEST, in law, is a call of witness, or an open affirmation that a person does, either not at all, or but conditionally, yield his consent to any act, or to the proceeding of any judge in a court in which his jurisdiction is doubtful; or to answer upon his oath farther than he is bound by law.

Any of the lords in parliament have a right to protest their dissent to any bill passed by a majority: which protest is entered in form. This is said to be a very antient privilege. The commons have no right to protest.

PROTEST, in commerce, is a summons wrote by a notary public to a merchant, banker, or the like, to accept or discharge a bill of exchange drawn on him, after his having refused either to accept or pay it.

There are two kinds of protests, the one for want of accepting the bill at the time of presenting it; the other for want of payment when it becomes due, whether it has been accepted or not.

The bearers of bills of exchange that have been accepted, or which become payable at a certain day, are obliged to have them either payed or protested within three days after they become due, and this protest is to be notified, within fourteen days after to the party from whom the bill was received, who, upon such protest being produced, is to repay the said bill with interest and charges from the time of the protesting; and in default

of such protest, or due notice within the days limited, the person so failing shall be liable to all costs, damages, and interest.

PROTESTANT, a name first given in Germany to those who adhered to the doctrine of Luther; because in 1529, they protested against a decree of the emperor Charles V. and the diet of Spires; declaring that they appealed to a general council. The same name has also been given to those of the sentiments of Calvin, and is now become a common denomination for all those of the reformed churches. See the articles **LUTHERANS** and **CALVINISTS**.

PROTESTATION, a solemn declaration made by some judiciary act or proceeding against any oppression, violence or injustice; or against the legality of a sentence, decree, or other procedure; importing that the party is determined to oppose it at the proper time. See the article **PROTEST**.

PROTHONOTARY, a term which properly signifies first notary, and which was antiently the title of the principal notaries of the emperors of Constantinople. Prothonotary with us is used for an officer in the courts of king's bench and common pleas; the former of which courts has one, and the latter three. The prothonotary of the king's bench records all civil actions sued in that court, as the clerk of the crown-office does all criminal causes. The prothonotaries of the common pleas enter and enrol all declarations, pleadings, assizes, judgments and actions: they also make out all judicial writs, except writs of habeas corpus, and distringas jurator, for which there is a particular office, called the habeas corpora office; they likewise enter recognizances acknowledged, and all common recoveries; make exemplifications of records, &c.

In the court of Rome, there is a college of twelve prelates, called apostolical prothonotaries, empowered to receive the last wills of cardinals, to make all informations and proceedings necessary for the canonization of saints, and all such acts as are of great consequence to the papacy: for which purpose they have the right of admission into all consistories, whether public or half public. They also attend on the pope, whenever he performs any extraordinary ceremony out of Rome.

PROTHYRIS, in the antient architecture, is

is sometimes used for a quoin or stone in the corner of a wall, and sometimes for a cross beam or rafter. Prothyris is also used by Vignola for a particular sort of key of an arch, an instance of which is found in the ionic order: it consists of a roll of water-leaves between two reglets and two fillets, crowned with a doric cymatium; its figure greatly resembling that of modillion.

PROTHYRUM, in architecture, a porch at the outer door of a house.

PROTO, *πρωτος*; a greek term, frequently used in composition of priority: thus, proto-collum, in the antient jurisprudence, signifies the first leaf of a book; proto-martyr, the first martyr; proto-plast, the first man formed, &c.

PROTONOTARY, or **PROTHONOTARY**. See the article **PROTHONOTARY**.

PROTO-TYPE, is the original or model after which a thing was formed; but chiefly used for the patterns of things to be engraved, cast, &c.

PROTOTYPHON, in grammar, sometimes denotes a primitive word. See the article **PRIMITIVE**.

PROTRACTION, in surveying, the same with plotting. See the article **PLOTTING** and **PROTRACTOR**.

PROTRACTOR, in surgery, a kind of forceps, so called from extracting foreign bodies out of wounds. See **WOUND**, **FORCEPS**, and **EXTRACTION**.

PROTRACTOR is also the name of an instrument used for protracting or laying down on paper the angles of a field, or other figure. See **PLOTTING**.

The protractor is a small semi-circle (plate CCXIV. fig. 1. n^o. 1) of brass, or other solid matter; the limb or circumference of which is nicely divided into 180 degrees: it serves not only to draw angles on paper, or any plane, but also to examine the extent of those already laid down. For this last purpose, let the small point, A, in the center of the protractor, be placed above the angular point, and let the side AB coincide with one of the sides that contain the angle proposed; then the number of degrees cut off by the other side, computing on the protractor from B, will shew the quantity of the angle that was to be measured.

But when any angle is to be made of a given quantity, suppose 40°, on a given line AB (*ibid.* n^o. 2.) and at a given point of that line A; upon this point

apply the center A of the protractor, in such a manner, that the side AB of the protractor may coincide with the given line AB; then let a dot or mark be made at the given number of degrees on the limb, *viz.* 40°, at C, and a right line drawn from C to A, will form an angle CAB = 40°, as is manifest.

This is the most natural and easy method either of examining the extent or quantity of an angle, or for describing an angle of any quantity required. But when a protractor is wanting, the same may be done by means of a line of chords: thus to lay down the foresaid angle CAB (*ibid.* n^o. 2.) by a line of chords, take 60° of the said line in your compasses, and from the center A describe an arch DE, which you imagine will be more than 40°; then taking the given number of degrees, *viz.* 40°, in your compasses, from the line of chords, and setting one foot in D, the point where AB produced intersects the arch DE, make a small sweep cutting the former arch in E; and, lastly, join the points A and E either wholly or in part as far as C, and the angle EAB or CAB = 40°, as is manifest.

When an obtuse angle is required to be laid down or measured, let its complement to a semi-circle be measured, and thence the obtuse angle will be found, and may be laid down as directed above. There is commonly annexed to this instrument, a fine needle fitted into a handle, and called a protracting-pin; the use of which is to prick off degrees and minutes from the limb of the protractor.

PROTUBERANCE, in anatomy, is any eminence whatever natural or preternatural, that projects or advances out beyond the rest.

PROVEDITOR, an officer in several parts of Italy, particularly at Venice; who has the direction of matters relating to policy. At Venice there is also a proveditor general of the sea, who pays the seamen and soldiers, and whose authority extends over the whole fleet when the captain-general is absent. The captain-general and proveditor are mutual spies upon one another; for though the proveditor be inferior to the general, yet is the power so divided, that the one has authority without strength, the other strength without authority.

PROVENCE, a province or government of France, bounded by Dauphine on the north;

north; by Piedmont on the east; by the Mediterranean on the south; and by the river Rhone, which separates it from Languedoc, on the west: it is about an hundred miles long, and near as many broad.

PROVEND, or **PROVENDER**, originally signified a kind of vessel containing the measure of corn daily given to a horse, or other beast of labour for his subsistence: but it is now used for all the food given to cattle.

PROVER, in law, the same with probator. See the article **PROBATOR**.

PROVERB, according to Camden, is a concise, witty, and wise speech, grounded upon experience, and for the most part containing some useful instruction.

Book of PROVERBS, a canonical book of the Old Testament, containing a part of the proverbs of Solomon, the son of David, king of Israel. The first twenty-four chapters are acknowledged to be the genuine work of that prince; the next five chapters are a collection of several of his proverbs, made by order of king Hezekiah; and the two last seem to have been added, though belonging to different and unknown authors, Agur the son of Jakeh, and king Lemuel.

In this excellent book are contained rules for the conduct of all conditions of life; for kings, courtiers, masters, servants, fathers, mothers, children, &c.

PROVERBS of Barthrouherri, a sacred book of the modern Indians. It is divided into three books, each containing ten chapters, and in each of these are ten sentences or proverbs. The first book is entitled, *Of the way which leads to Heaven*; the second, *Of the conduct of a rational creature*; and the third, *Of love*.

PROVIDENCE, the conduct and direction of the several parts of the universe, by a superior intelligent being.

The notion of a providence is founded on this supposition, that the creator has not so fixed and ascertained the laws of nature, nor so connected the chain of second causes, as to leave the world to itself; but that he still preserves the reins in his own hands, and occasionally interposes, alters, enforces, restrains, and suspends those laws by a particular interposition.

Some, with the epicureans, deny a providence, as imagining it inconsistent with the happiness of the divine nature. See the article **EPICUREAN PHILOSOPHY**.

Others again deny the existence of a providence, on account of the seemingly unjust distribution of good and evil. See the articles **GOOD** and **EVIL**.

Simplicius argues thus for a providence: If God do not look to the affairs of the world, it is either because he cannot or will not; but the first is absurd, since to govern cannot be difficult, when to create was easy; and the latter is both absurd and blasphemous. See the article **GOD**. The sentiments of Cicero are likewise very precise and pertinent to this purpose: he thinks it impossible for one who duely considers the innumerable objects of the universe, and their invariable order and beauty, to entertain the least doubt, but that there is some efficient cause who presides over and directs the mighty fabric! Nay he lays it down as a fundamental principle of all societies, that there is a divine providence, which directs all events, observes the actions of mankind, whether good or bad, discerns the very intention of the heart, and will certainly make a difference between good men and the wicked.

Nuns of PROVIDENCE, a community of young women at Paris, who make two vows, viz. of chastity and obedience. They are habited in black, and board young ladies who chuse to be educated among them.

PROVIDENCE-PLANTATION, a colony of New-England, which, with Rhode-island, constitutes a charter-government: its chief town is Newport.

PROVIDENCE is also one of the Bahama-islands, planted and fortified by the English: west long. 78°, north lat. 25°.

PROVINCE, *provincia*, in roman antiquity, a country of considerable extent, which, upon being entirely reduced under the roman dominion, was new-modelled according to the pleasure of the conquerors, and subjected to the command of annual governors sent from Rome; being commonly obliged to pay such taxes and contributions as the senate thought fit to demand.

These provinces got the appellations of consular or pretorian, according as they were governed by consuls or pretors. See the articles **CONSUL** and **PRETOR**.

PROVINCE, in geography, a division of a kingdom or state, comprising several cities, towns, &c. all under the same government, and usually distinguished by the extent either of the civil or ecclesiastical jurisdiction.

The

The church distinguishes its provinces by archbishoprics; in which sense, England is divided into two provinces, Canterbury and York. See the articles **CANTERBURY** and **YORK**.

The united provinces, are the seven northern provinces of the low countries, who, revolting from the Spanish dominion, made a perpetual alliance, offensive and defensive, at Utrecht, anno 1579. See the article **NETHERLANDS**.

PROVINCIAL, *provincialis*, something relating to a province. See the preceding article.

It also denotes, in Romish countries, a person who has the direction of the several convents of a province.

PROVINE, a branch of a vine laid in the ground to take root and propagate. See the article **VINE**.

PROVINS, a city of Champaign, in France, forty-five miles south-east of Paris.

PROVISION, in the canon law, denotes the title or instrument, by virtue whereof an incumbent holds a benefice, bishopric, &c.

Provisions by prevention, called also *gratiae expectativæ* & *mandata de providendo*; see the article **PREMUNIRE**.

PROVISO, in law, a condition inserted in a deed, upon the observance whereof the validity of the deed depends.

Priviso, in judicial matters, is where the plaintiff desists from prosecuting an action, by bringing it to trial in due time; in which case, the defendant may take out a venire facias to the sheriff in these words, Priviso quod, &c. to the end that, if the plaintiff take out any writ to that purpose, the sheriff shall summon but one jury upon them both. In which case it is called going to trial by priviso.

PROVISOR, in general, denotes one who hath the care of providing things necessary, being the same with purveyor.

PROVISOR, in our statutes, also denotes a person who sued to the court of Rome for a provision or expectative grace. See the article **PREMUNIRE**.

PROVOCATIVE, in physic, a medicine which is supposed to strengthen nature, and incites to venery.

PROVOST, *præpositus*, an officer, whereof there are divers kinds, civil, military, &c.

PROVOST of a city or town, is the chief municipal magistrate in several trading cities, particularly Edinburgh, Paris,

&c. being much the same with mayor in other places.

He presides in city courts, and, together, with the baillies, who are his deputies, determines in all differences that arise among citizens.

The provost of Edinburgh, as well as all the other considerable towns in Scotland, has the title of lord; and the former calls yearly conventions of the royal boroughs to Edinburgh by his missives.

PROVOST, or **PREVOT ROYAL**, a sort of inferior judge established throughout France, to take cognizance of all civil, personal, real, and mixed causes, among the people only.

Grand PROVOST of France, or of the household, has jurisdiction in the king's house, and over the officers therein; looks to the policy thereof, the regulation of provisions, &c.

Grand PROVOST of the constable, a judge who manages processes against the soldiers in the army who have committed any crime.

He has four lieutenants distributed throughout the army, called provosts of the army, and, particularly, provosts in the several regiments.

PROVOST marshal of an army, is an officer appointed to seize and secure deserters, and all other criminals. He is to hinder soldiers from pillaging, to indict offenders, and see the sentence passed on them executed. He also regulates the weights and measures, and the price of provisions, &c. in the army. For the discharge of his office, he has a lieutenant, a clerk, and a troop of marshal-men on horseback, as also an executioner.

There is also a provost marshal in the navy, who hath charge over prisoners, &c.

The French have a provost-general of the marines, who is to prosecute the marines, when guilty of any crime, and make report thereof to the council of war; besides a marine provost in every vessel, who is a kind of gaoler, and takes the prisoners into his care, and keeps the vessel clean.

PROVOSTS of the marshals, are a kind of lieutenants of the marshals of France; of these are an hundred and eighty seats in France; their chief jurisdiction regards highwaymen, footpads, house-breakers, &c. See **MARSHAL**.

PROVOST of the mint, a particular judge instituted for the apprehending and prosecuting of false coiners.

PROVOST, or **PREVOT**, in the king's stables; his office is to attend at court, and hold the king's stirrup, when he mounts his horse, &c. There are four provosts of this kind, each of whom attends in his turn, monthly.

PROW, *prora*, in navigation, denotes the head or fore-part of a ship, particularly in a galley, being that which is opposite to the poop or stern. See **SHIP**.

In the middle of the prow is the beak that cuts the water, on the top of which is commonly some figure or hieroglyphic.

The prow is lower than the poop, and contains fewer decks.

PROXENETA, or **PROXENETES**, a kind of broker or agent, who transacts between two persons.

It is chiefly applied to those who negotiate marriages, &c.

The proxenetæ made a kind of college in Rome; and to them the fathers addressed themselves to sound the inclinations of the young men they intended for their daughters.

PROXIMITY, *proximitas*, denotes the relation of nearness, either in respect of place, blood, or alliance.

PROXY, *procurator*, a person who officiates as a deputy in the room of another.

Princes are usually married by proxies, or representatives; and every peer of Great Britain has the privilege of constituting a proxy, to vote for him in his absence: yet such a one must be entered in person, and sometimes these proxies have been refused by the king.

The term proxy or procuracy, among civilians, also denotes a commission given to a proctor by a client, empowering him to manage a cause in his stead. See the article **PROCTOR**.

And among canonists, proxies signify annual payments otherwise called procurations. See **PROCURATION**.

PRUCH, or **BRUGG**, a town of Austria, in Germany, twenty-two miles south-east of Vienna.

PRUCK, or **BRUCH**, of Stiria, in Germany, sixty miles south west of Vienna.

PRUINA, **HOAR-FROST**, in physiology. See the article **FROST**.

Sal PRUNELLÆ, in pharmacy, a preparation of purified saltpetre, called also crystal mineral, made in this manner: having melted any quantity of saltpetre, cast a little flowers of sulphur upon it, and when that is burnt throw on more; and continue to do so, till the nitre flow

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as clear as rock-water. Then with a clean iron or brass-ladle take it out, and putting it into moulds till coagulated, preserve it for use.

It is said to be diuretic and cooling, and therefore often given in fevers: it is also very good in gonorrhæas, sore throats, and inflammations of the tonsils; being gently melted in the mouth, and swallowed with a little fine sugar.

Its dose is from six grains to a dram.

PRUNES, in commerce, are plums dried in the sunshine, or in an oven. See the article **PLUM**.

Prunes of Brunolia pay for each pound, on importation, a duty of $2\frac{32\frac{1}{2}}{100}$ d. and

draw back, on exportation, $2\frac{4}{100}$ d.

PRUNIFEROUS TREES, those with pretty large and fleshy fruit, with a nucleus in the middle, and called by botanists a drupe. See the article **DRUPE**.

PRUNING, in gardening and agriculture is the lopping off the superfluous branches of trees, in order to make them bear better fruit, grow higher, or appear more regular.

Pruning, tho' an operation of very general use, is nevertheless rightly understood by few; nor is it to be learned by rote, but requires a strict observation of the different manners of growth of the several sorts of fruit-trees; the proper method of doing which cannot be known without carefully observing how each kind is naturally disposed to produce its fruit: for some do this on the same year's wood, as vines; others, for the most part, upon the former year's wood, as peaches, nectarines, &c. and others upon spurs which are produced upon wood of three, four, &c. to fifteen or twenty years old, as pears, plums, cherries, &c. therefore, in order to the right management of fruit trees, provision should always be made to have a sufficient quantity of bearing wood in every part of the trees, and at the same time there should not be a superfluity of useless branches, which would exhaust the strength of the trees, and cause them to decay in a few years.

The reasons for pruning of fruit-trees; are, 1. To preserve them longer in a vigorous bearing-state; 2. To render them more beautiful; and, 3. To cause the fruit to be larger and better tasted.

The general instructions for pruning are as follows: the greatest care ought to be taken of fruit-trees in the spring, when they

they are in vigorous growth; which is the only proper season for procuring a quantity of good wood in the different parts of the tree, and for displacing all useless branches as soon as they are produced, in order that the vigour of the tree may be entirely distributed to such branches only as are designed to remain. For this reason trees ought not to be neglected in April and May, when their shoots are produced: however, those branches which are intended for bearing the succeeding year should not be shortened during the time of their growth, because this would cause them to produce two lateral shoots from the eyes below the place where they were stopped, which would draw much of the strength from the buds of the first shoot: and if these two lateral shoots are not entirely cut away at the winter pruning, they will prove injurious to the tree. This is to be chiefly understood of stone-fruit and grapes; but pears and apples, being much harder, suffer not so much, tho' it is a great disadvantage to those also to be thus managed. It must likewise be remarked, that peaches, nectarines, apricots, cherries and plums are always in the greatest vigour when they are least maimed by the knife, for where large branches are taken off they are subject to gum and decay; it is therefore the most prudent method to rub off all useless buds when they are first produced, and to pinch others, where new shoots are wanted to supply the vacancies of the wall; by which management they may be so ordered as to want but little of the knife in winter-pruning. The management of pears and apples is much the same with these trees in summer; but in winter they must be very differently pruned: for as peaches and nectarines, for the most part, produce their fruit upon the former year's wood, and must therefore have their branches shortened according to their strength, in order to produce new shoots for the succeeding year; so, on the contrary, pears, apples, plums, and cherries, producing their fruit upon spurs, which come out of the wood of five, six, and seven years old, should not be shortened, because thereby those buds which were naturally disposed to form these spurs, would produce wood-branches; by which means the trees would be filled with wood, but would never produce much fruit. The branches of standard-trees should never be shortened unless

where they are very luxuriant, and by growing irregularly on one side of the trees, attract the greatest part of the sap, by which means the other parts are either unfurnished with branches, or are rendered very weak; in which case the branch should be shortened down as low as is necessary, in order to obtain more branches to fill up the hollow of the tree: but this is only to be understood of pears and apples, which will produce shoots from wood of three, four, or more years old; whereas most sorts of stone-fruit will gum and decay after such amputations: whenever this happens to stone-fruit, it should be remedied by stopping or pinching those shoots in the spring, before they have obtained too much vigour, which will cause them to push out side branches; but this must be done with caution. You must also cut out all dead or decaying branches, which cause their heads to look ragged, and also attract noxious particles from the air: in doing of this, you should cut them close down to the place where they were produced, otherwise that part of the branch which is left will also decay, and prove equally hurtful to the rest of the tree; for it seldom happens when a branch begins to decay, that it does not die quite down to the place where it was produced, and if permitted to remain long uncut, often infects some of the other parts of the tree. If the branches cut off are large, it will be very proper, after having smoothed the cut part exactly even with a knife, chisel, or hatchet, to put on a plaster of grafting clay, which will prevent the wet from soaking into the tree at the wounded part. All such branches as run a-cross each other, and occasion a confusion in the head of the tree, should be cut off; and as there are frequently young vigorous shoots on old trees, which rise from the old branches near the trunk, and grow upright into the head, these should be carefully cut out every year, lest, by being permitted to grow, they fill the tree too full of wood. For pruning the roots and branches of trees in transplanting them, see the article PLANTING.

As to the pruning of forest-trees, if they be large, it is best not to prune them at all; yet, if there be an absolute necessity, avoid taking off large boughs as much as possible. And, 1. If the bough be small, cut it smooth, close, and sloping. 2. If the branch be large, and the tree old, cut it

it off at three or four feet from the stem.

3. If the tree grow crooked, cut it off at the crook sloping upward, and nurse up one of the most promising shoots for a new stem. 4. If the tree grow top-heavy, its head must be lightened, and that by thinning the boughs that grow out of the main branches. But if you would have them spring, rub off the buds, and shroud up the side-shoots. 5. If the side-bough still break out, and the top be able to sustain itself, give the boughs that put forth in spring a pruning after Midsummer, cutting them close.

PRUNUS, the **PLUM-TREE**, in botany.

See the article **PLUM-TREE**.

PRURITUS, or **PRURIGO**, among physicians, denotes an itching sensation.

See the article **ITCH**.

PRUSSIA, a province of Poland, situated on the coast of the Baltic sea; and divided into regal and ducal Prussia, the first subject to Poland, and the last to the king of Prussia.

PRUSSIAN BLUE, among painters, &c. an animal-colour, prepared thus: take of crude tartar and nitre, each four ounces; pulverize and mix them together, and by decrepitation, bring them to a fixed salt; which being powdered hot, add to it four ounces of thoroughly dried ox-blood, reduced to a fine powder: calcine the mixture in a close crucible, whereof it may fill two thirds: then lightly grind the matter in a mortar, and throw it hot into two quarts of boiling water; boil them together for half an hour, and afterwards, straining off the liquor, wash the remaining black substance with fresh water, and strain as before, continuing to do this till the water poured off becomes insipid: put the several liquors together, and evaporate them to two quarts. Next, dissolve an ounce of green vitriol, first calcined to whiteness, in six ounces of rain-water, and filtre the solution: dissolve also half a pound of crude alum in two quarts of boiling water; and add this to the solution of vitriol, taken hot from the fire, pouring to them likewise the first lixivium, whilst thoroughly hot, in a large vessel; a great ebullition and a green colour will immediately ensue; whilst this ebullition continues, pour the mixture out of one vessel into another, and afterwards let it rest; then strain the liquor through a linen cloth, and let the matter or pigment remain in the strainer, from whence put it, with a wooden spa-

tula, into a small new pot; pour upon it two or three ounces of spirit of salt, and a beautiful blue colour will immediately appear. Let the matter be now well stirred, then suffered to rest for a night; afterwards thoroughly edulcorate it by repeated affusions of rain-water, allowing a proper time for the precipitate to subside; and being drained in a linen-strainer, and gently dried, it at last becomes the pigment called prussian blue, of an exquisite colour. See the articles **COLOUR**, **PAINTING**, **BLUE**, &c.

PRYTANEUM, *πρυτανειον*, in grecian antiquity, a large building in Athens, where the council of the prytanes assembled, and where those, who had rendered any signal service to the commonwealth, were maintained at the public expence. See the next article.

PRYTANES, *πρυτανεις*, in grecian antiquity, were the presidents of the senate, whose authority consisted chiefly in assembling the senate; which, for the most part, was done once every day.

The senate consisted of five hundred, fifty senators being elected out of each tribe; after which, lots were cast, to determine in what order the senators of each tribe should preside, which they did by turns, and during their presidentship were called prytanes. However, all the fifty prytanes of the tribes did not govern all at once, but ten at a time, viz. for seven days; and after thirty-five days, another tribe came into play, and presided for other five weeks; and so of the rest.

PSADURIA, a class of coarser stones, of a laxer texture, not laminated, but splitting with equal ease in all directions. Of this class there are two genera, 1. Psaduria, consisting of pure crystal and spar, without any admixture of heterogeneous particles, and containing seven different species. 2. Impure psaduria, consisting of sparry, crystalline, and talcy particles, and containing six different species.

PSALM, *ψαλμ*, a divine song or hymn; but chiefly appropriated to the hundred and fifty Psalms of David, a cononical book of the Old Testament.

Most of the Psalms have a particular title, signifying either the name of the author, the person who was to set it to music or sing it, the instrument that was to be used, or the subject and occasion of it. Some have imagined, that David was the sole author of the Book of Psalms; but the titles of many of them prove the contrary, as Psalm xix. which appears

to have been written by Moses. Many of the Psalms are inscribed with the names Korah, Jeduthun, &c. from the persons who were to sing them. Psalm lxxii. and cxxvii. are under the name of Solomon; the former being composed by David for the use of his son, and the latter being probably composed by Solomon himself. The authority and canonicalness of the Book of psalms has always been acknowledged, both by jews and christians. However, nothing can be a greater argument of its obscurity than the great number of commentaries upon them.

Sternhold, one of the grooms of the privy-chamber to king Edward VI. set about a translation of the Psalms into english metre; but he only went through thirty-seven of them, the rest being soon after done by Hopkins and others. This translation was at first discountenanced by many of the clergy, who looked upon it as done in opposition to the practice of chanting the Psalms in cathedrals: and indeed, says Broughton, the use of these singing Psalms is rather connived at than allowed; since no one could ever discover any authority for it, either from the crown or convocation.

PSALMODY, *ψαλμωδία*, the art or act of singing psalms. See the preceding article.

Psalmody was always esteemed a considerable part of devotion, and usually performed in the standing posture; and as to the manner of pronunciation, the plain song was sometimes used, being a gentle inflection of the voice, not much different from reading, like the chant in our cathedrals: at other times more artificial compositions were used, like our anthems.

As to the persons concerned in singing, sometimes a single person sung alone; sometimes the whole assembly joined together, which was the most antient and general practice. At other times the psalms were sung alternately, the congregation dividing themselves into two parts, and singing verse about, in their turns. There was also a fourth way of singing, pretty common in the IVth century, which was, when a single person began the verse, and the people joined with him in the close: this was often used for variety, in the same service with alternate psalmody.

The use of musical instruments, in the singing of psalms, seems to be as antient

as psalmody itself; the first psalm we read of, being sung to the timbrel, viz. that of Moses and Miriam, after the deliverance of the Israelites from Egypt; and afterwards, musical instruments were in constant use in the temple of Jerusalem. When the use of organs was introduced into the christian church, is not certainly known; but we find about the year 660, that Constantine Copronymus, emperor of Constantinople, sent a present of an organ to Pepin king of France.

PSALTER, *ψαλτηριον*, the same with the Book of Psalms. See the article **PSALM**. Among the religious, in the popish countries, the term psalter is also given to a large chapelet or rosary, consisting of an hundred and fifty beads, according to the number of psalms in the psalter.

PSALTERY, *ψαλτηριον*, a musical instrument, much in use among the antient Hebrews, who called it nebel.

We know little or nothing of the precise form of the antient psaltery. That now in use is a flat instrument, in form of a trapezium, or triangle truncated at top; it is strung with thirteen wire-chords, set to unison or octave, and mounted on two bridges, on the two sides: it is struck with a plectrum, or little iron-rod, and sometimes with a crooked stick. Its chest or body resembles that of a spinet.

PSEUDO, from *ψευδος*, a greek term used in the composition of many words, to denote false, or spurious; as the pseudo-acacia, or bastard-acacia; pseudo-fumaria, or bastard-fumitory; pseudo-ruta, or bastard-rue, &c. See the articles **ROBINIA**, **FUMITORY**, and **RUE**.

We also say a pseudo-apostle, or false apostle; a pseudo-prophet, or false prophet, &c. See the articles **APOSTLE**, **PROPHET**, &c.

PSEUDO-DIPTERE, in antient architecture. See the article **DIPTERE**.

PSEUDONYMUS, *ψευδωνυμος*, among critics, an author who publishes a book under a false or feigned name, as cryptonymus is given to him who publishes one under a disguised name, and anonymous to him who publishes without any name at all.

PSEUDO-STELLA, any kind of meteor, newly appearing in the heavens, and resembling a star.

PSIDIUM, in botany, a genus of the iccandria-monogynia class of plants, the flower whereof consists of five oval, concave, and patent petals; and its fruit is a very

a very large unilocular berry, containing a great number of very small seeds.

PSILOTHRON, in medicine, the same with depilatory. See **DEPILATORY**.

PSITTACUS, the **PARROT**, in ornithology. See the article **PARROT**.

PSOAS, in anatomy, the name of two muscles, distinguished by the epithets *magnus* and *parvus*. The *psoas magnus* is one of the flexor-muscles of the thigh, and arises from the first, second, third, and fourth vertebræ of the loins. The *psoas parvus* is one of the flexor-muscles of the loins, which arises by a slender tendon from the os pubis, where it is joined to the ilium; and is inserted into the side of the upper vertebra of the loins; it is often wanting, and when found, its office is to assist the quadratus in elevating the ossa innominata, especially when we lie down.

PSORA, *ψωρα*, in medicine, the same with the itch. See the article **ITCH**.

PSORALIA, the **ITCH TREE**, in botany, a genus of the diadelphia-decandria class of plants, with a papilionaceous flower; and the fruit is a pod, of the length of the cup, and contains only one kidney-shaped seed.

PSOROPHTHALMIA, *ψωροφθαλμία*, a scurfy eruption of the eye-brows, attended with an itching of the part.

PSYCHOLOGY, *ψυχολογία*, that branch of anthropology which treats of the soul, its faculties, passions, &c. See **SOUL**, **FACULTY**, **PASSIONS**, &c.

PSYCHOMANCY, *ψυχομαντεία*, a kind of divination, performed by raising the souls of persons deceased. See the article **DIVINATION**.

PSYCHROMETER, an instrument for measuring the degrees of coldness or heat in the air, and more usually called thermometer. See **THERMOMETER**.

PSYLLIUM, **FLEA-WORT**, in botany, is comprehended by Linnæus among the plantains. See pl. CCVIII. fig. 4. and the article **PLANTAIN**.

The seeds of psyllium are recommended in the dysentery, and corrosion of the intestines. See the article **DYSENTERY**.

PTARMICA, in pharmacy, medicines proper to excite sneezing, and otherwise called sternutatories. See the article **STERNUTATORY**.

PTARMICA, **SNEEZE-WORT**, in botany, a genus of the syngenesia-polygamia-superflua class of plants, the compound flower whereof is radiated, and the peculiar hermaphrodite ones of a funnel-shape, with

a patulous quinquifid limb; the stamina are five capillary very short filaments; and the seeds, one of which succeeds each hermaphrodite flower, are contained in the cup. See plate CCVIII. fig. 5.

The leaves of this plant are sometimes used in salad; and when dried, and reduced to powder, they make a good sternutatory.

PTELEA, in botany, a genus of the tetrandria-monogynia class of plants, the flower whereof consists of four lanceolated, plane, patent petals; and its fruit is a circular membrane, placed perpendicularly with a cavity in the middle, containing a single seed.

PTERARIA, in the history of insects, a name given to that series of insects, which have wings. See **INSECT**.

Of the insects of this series, some have only two wings, others have four; they are hence naturally arranged into the two orders of the diptera and the tetraptera. See **DIPTERA** and **TETRAPTERA**.

PTERIS, in botany, a genus of the cryptogamia-filicum class of plants, in which the fructifications are disposed in form of a line, surrounding the edges of the lower side of the leaves.

This genus comprehends the female fern and the rough spleenwort.

PTEROPHORI, *πτεροφοροι*, in roman antiquity, the messengers, or couriers, who brought tidings of a declaration of war, or the like; so called from their carrying wings on the points of their pikes.

PTERYGIUM, in surgery, the same with pannus or unguis. See **UNGUIS**.

PTERYGOIDE, something resembling a wing; from a resemblance to which, four apophyses or processes of the os sphenoides have been called pterygoide. See the article **SPHENOIDES**.

PTERYGOIDÆUS, in anatomy, the name of two muscles of the lower jaw, one internal and the other external. The internal pterygoidæus-muscle has its origin in the cavity of the pterygoide process, and its termination is in the interior and lower superficies of the angle of the jaw. The external pterygoidæus arises from the exterior lamina of the same process, and terminates a little above the insertion of the other.

There are also several pairs of muscles of the pharynx and uvula, as the pterygo-pharyngæus, and pterygo-staphylinus, which have got their names from being connected by the same process. The pterygo-staphylinus arises from the upper part

part of the said process, and descending between its two lamellæ, turns back its tendon over the thin apophysis of the interior lamella, as over a pulley, to the anterior part of the membrane of the palate, into which it is inserted, and serves to draw the uvula downwards and forwards.

PTISAN, *πτισαν*, is properly barley decorticated, or deprived of its hulls, by beating in a mortar, as was the antient practice: though the cooling potion, obtained by boiling such barley in water, and afterwards sweetening the liquor with liquorice-root, is what at present goes by the name of ptisan; and to render it laxative, some add a little senna, or other herbs of the same intention.

PTOLEMAIC, or **PTOLEMÆAN** *system of astronomy*, is that invented by Claudius Ptolemæus, a celebrated astronomer and mathematician of Pelusium, in Egypt, who lived in the beginning of the II^d century of the christian æra.

This hypotheses supposes the earth immoveably fixed in the center, not of the world only, but also of the universe: and that the sun, the moon, the planets, and stars all move about it, from east to west, once in twenty-four hours, in the order following, *viz.* the moon next to the earth, then mercury, venus, the sun, mars, jupiter, saturn, the fixed stars, the first and second crystalline heavens, and above all the fiction of their primum mobile. See plate CCXIV. fig. 2. See also MOON, &c.

This system or hypothesis was first invented, and adhered to, chiefly because it seemed to correspond with the sensible appearances of the celestial motions. They took it for granted, that the motions which those bodies appeared to have, were such as they truly and really performed: and not dreaming of any motion in the earth, nor being apprized of the distinction of absolute and relative or apparent motion, they could not make a proper judgment of such matters; but were under a necessity of being misled by their senses, for want of the assistances we now enjoy.

It is easy to observe, they had no notion of any other system but our own, nor of any other world but the earth on which we live. They imagined that all the fixed stars were contained in one concave sphere, and that the primum mobile was circumscribed by the empyreal heaven, of a cubic form, which they supposed to be

heaven, or the blissful abode of departed souls.

It would scarce have been worth while to have said so much about so absurd an hypothesis, as this is now well known to be, were it not that there are still numerous retainers thereto, who endeavour very zealously to defend the same, and that for two reasons principally, *viz.* because the earth is apparently fixed in the center of the world, and the sun and stars seem to move about it daily; and also because the scripture asserts the stability of the earth, the motion of the sun, &c. But that the diurnal motion of the earth occasions all these appearances, we have abundantly proved under the articles **DIURNAL** and **COPERNICAN**.

And as to the argument drawn from scripture, as it was never intended for an institution of astronomy and philosophy, so nothing in it is to be understood as strictly or positively asserted in relation thereto; but only as spoken agreeably to the common phrase, or vulgar notion of things: and thus Sir Isaac Newton himself would always say, the sun rises, sets, &c. though he well knew it was just the reverse in fact; since there are divers phenomena of the heavenly bodies altogether inconsistent with, and, in some things, exactly contradictory to such an hypothesis, as has been shewn by the arguments adduced to prove the truth of the copernican system. See **COPERNICAN**.

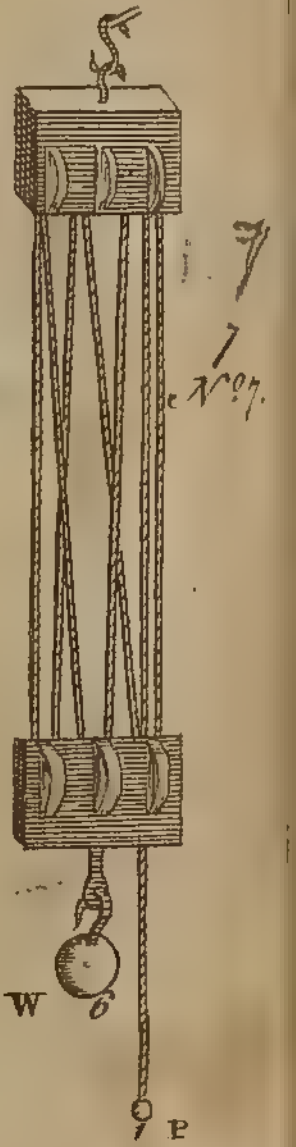
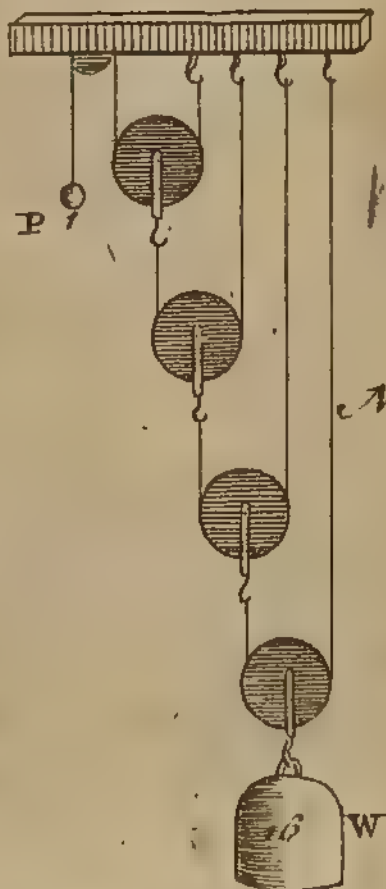
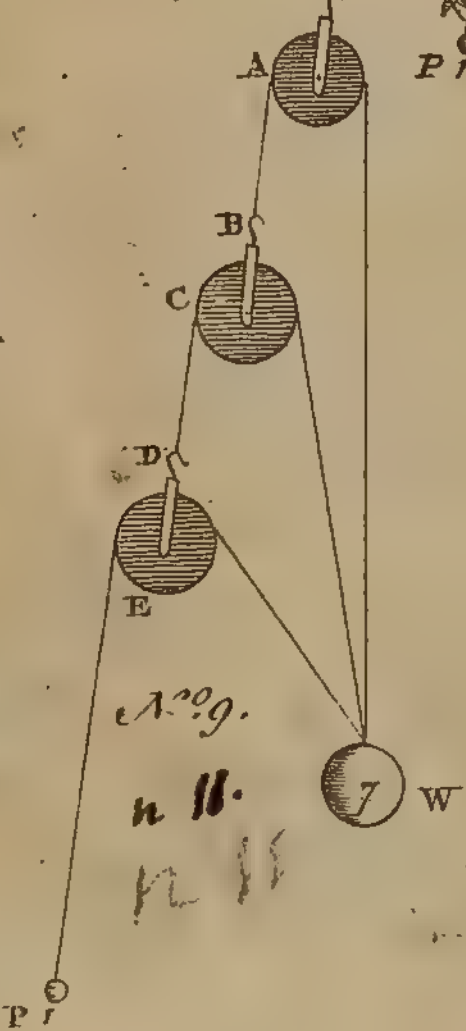
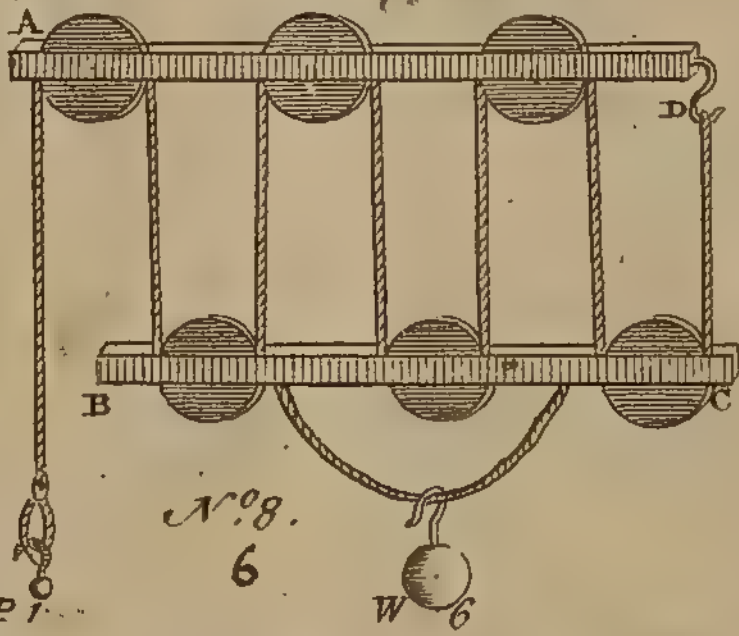
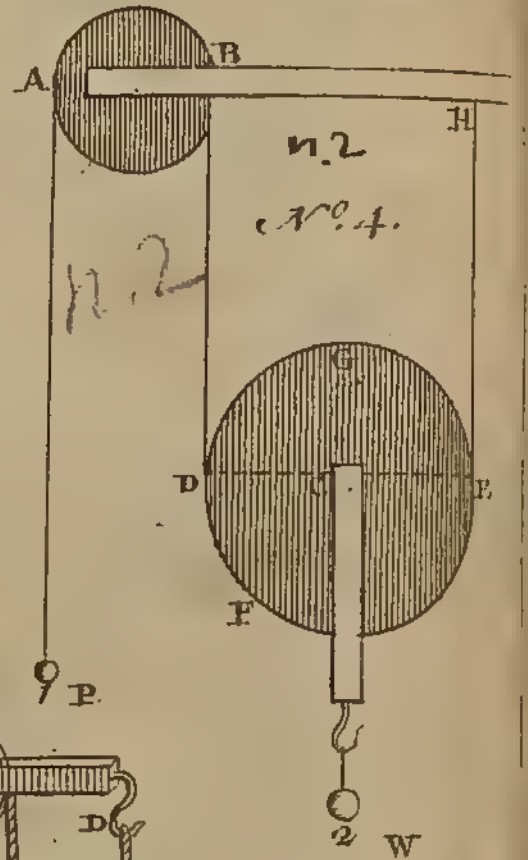
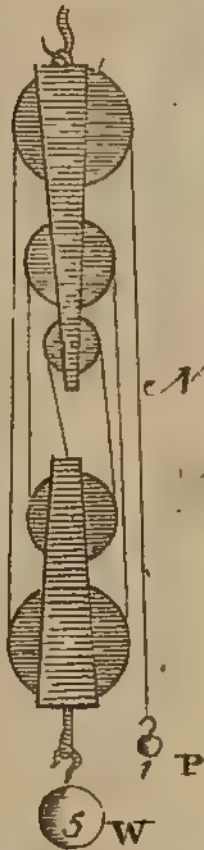
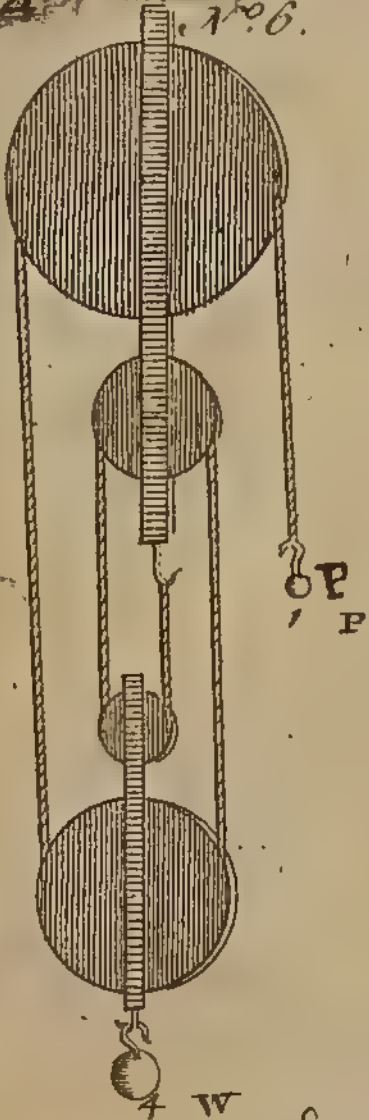
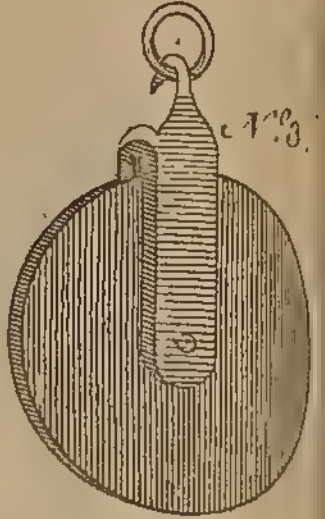
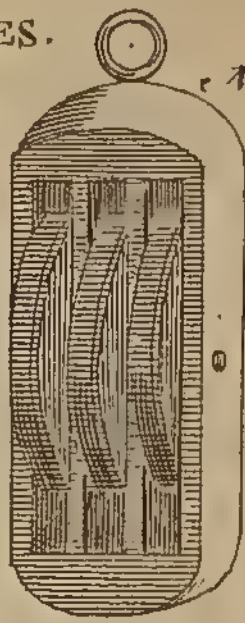
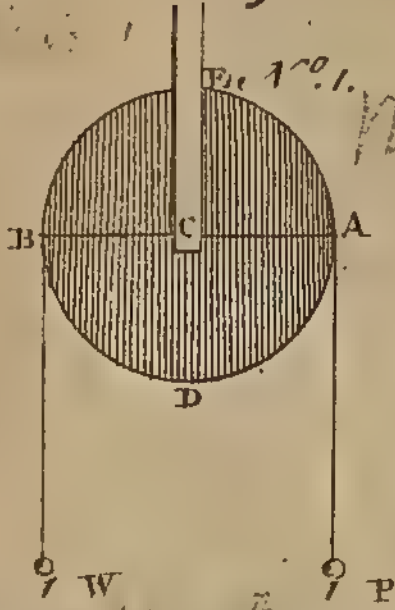
PTYALISM, *πτυαλισμός*, in medicine, a salivation, or frequent and copious discharge of saliva. See **SALIVATION**.

PUBERTY, *pubertas*, among civilians, &c. the age wherein a person is capable of procreation, or begetting children.

Boys arrive at puberty at fourteen years of age, and girls at twelve: eighteen years of age is accounted full puberty.

The natural state of mankind, after puberty, says M. Buffon, is that of marriage, wherein they may make use of the new faculties they have obtained, by arriving at puberty; a state which will become painful, and may even sometimes be fatal, if celibacy be obstinately persisted in. The too long continuance of the seminal liquor in the vessels, formed to contain it, may produce disorders in either sex, or at least irritations so violent, that the united force of reason and religion will scarcely be sufficient to enable him to resist those impetuous passions, which render man like the beasts, who are furious and head-strong, when they

PULLIES.



they feel the force of these impressions. The extreme effect of this irritation in women is what physicians call the furor uterinus; but the mere force of nature alone seldom produces those fatal passions that spring from this disorder. See the article FUROR UTERINUS.

An opposite constitution of body is infinitely more common amongst women; the greatest part of them are naturally cold, or more or less tranquil under this passion: there are also men who continue chaste without the least difficulty; and he observes, that he has known some, who have enjoyed a good state of health, and have arrived to a considerable age, without being prompted by nature to gratify this passion in any manner whatsoever.

PUBES, among anatomists, &c. denotes the middle part of the hypogastric region of the abdomen, lying between the two inguina or groins. See ABDOMEN.

In adults, the pubes is more or less protuberant, and covered with hair; the appearance of which is the first sign of puberty. See the preceding article.

The pubes is that part of the abdomen which surrounds, in a great measure, the parts of generation. See the article GENERATION.

The os pubis is one of the three ossa innominata. See INNOMINATA.

The foramen of this bone is remarkable, as being the largest of all the foramina of the bones; it makes room for the passage of two muscles of the thigh, and the crural arteries and veins. In women, the os pubis is much smaller, and placed at a greater distance from the other bones than in men; and the angle between it and the ischium, is also larger in proportion in females: a circumstance very favourable not only to the gestation of the foetus, but likewise to its exclusion. See the articles FOETUS and DELIVERY.

PUBLICAN, *publicanus*, among the Romans, one who farmed the taxes and public revenues.

PUBLICATION, *publicatio*, the act of making a thing known to the world; the same with promulgation.

By the canons, publication is to be made of the banns of matrimony, three times before the ceremony can be solemnized, without special licence to the contrary.

PUCELLAGE, *pucellagium*, or *puellagium*, denotes the state of virginity. See the article VIRGINITY.

PUCERON, *pedura*, in zoology, a genus

of wingless insects, with fewer than six pair of legs. The body is short and roundish; the tail is crooked and forked; the legs are three pairs, and serve only for walking; and the eyes are two, but each composed of eight lesser ones.

The pucerons are extremely numerous, living on the young branches of trees and plants; and often found in such clusters, as wholly to cover them: they are usually denominated from the trees and places where they are found; there being scarce a vegetable, either in the fields or gardens, that has not a peculiar species of puceron to feed on its juices.

PUDENDA, the parts of generation in both sexes. See GENERATION.

PUERILITY, in discourse, is defined by Longinus, to be a thought, which, by being too far-fetched, becomes flat and insipid. Puerility, he adds, is the common fault of those who affect to say nothing but what is brilliant and extraordinary.

PUGIL, *pugillus*, in physic, &c. such a quantity of flowers, seeds, or the like, as may be taken up between the thumb and two fore-fingers.

It is esteemed to be the eighth part of the manipule or handful.

PUISNE, or PUNY, in law, one younger born. It is not only applied to the second, third, fourth, &c. child, with regard to the first-born; but to the third, with regard to the second, &c. The last of all is called cadet.

It is also applied to a judge, or counsellor, who is in some respect inferior to another.

PULEX, the FLEA, in zoology. See the article FLEA.

PULLEY, *trochlea*, in mechanics, one of the mechanical powers, called by seamen a tackle. See TACKLE and POWER.

When a little wheel, commonly called a sheave, or sheever, is so fixed in a box or block, as to be moveable round a center-pin, passing thro' it, such an instrument is called a pulley. See plate CCXV. n° 3. And sometimes, though improperly, a box or block with several sheevers in it, is also called a pulley, as that represented *ibid*, n° 2. The first of these is, by workmen, called a snatch-block.

A rope going round one or more pullies, in order to raise a weight, is called the running-rope; and when a block and its sheevers is so fixed, that whilst it remains

im-

immoveable, another block and sheevers rises, with the weight hanging at it, such a machine is called a pair of blocks.

If *A D B E* (*ibid.* n° 1.) be a pulley, upon which hang the weights *P*, *W*; then, since the nearest distances of the strings *A P*, and *B W*, from the center of motion *C*, are *A C* and *B C*, the pulley will be reduced to the lever or ballance, *A B*, with respect to its power; and from thence it appears, that since $A C = B C$, we shall always have $P = W$, for an equilibrium; and, therefore, no advantage in raising a weight, &c. can be had from a single pulley. In a combination of two pulleys, *A B*, and *D F E G* (*ibid.* n° 4.) the power is doubled; for the pulley *D F E G* is reducible to the lever *E D*, which must be considered as fixed in the point *E*, to the immovable string *H E*; and the power acting at *D*, is equal to *P*; and the weight *W*, is sustained from the center *C*, of the pulley; but $P : W :: C E : D E$; therefore, since $D E = 2 C E$, it is $W = 2 P$, or $P = \frac{1}{2} W$.

From what has been said, we may deduce the following rule, to know the advantage to be gained by a pair of blocks, let their number of pulleys and sheevers be what they will, *viz.* as 1 is to the number of ropes, or of the parts of the rope, applied to the lower pulleys, so is the weight to the power. Thus, it is evident, that in n° 1. one pound sustains only a weight of one pound; in n° 4. 1 pound sustains a weight of 2 pounds; in n° 5. a weight of 5 pounds; and in n° 6, 7, and 8. 1 pound raises 4 and 6 pounds. However, it ought to be observed, that the above rule is only applicable where the lower pulleys rise altogether in one block, along with the weight; for when they act upon one another, and the weight is only fastened to the lowermost, the force of the power is doubled by each pulley: thus, in n° 10. a power equal to 1 pound, will sustain 16 pounds, by means of four pulleys; because $1 \times 2 \times 2 \times 2 \times 2 = 16$. Again, in the combination of pulleys, represented in plate CCXIV. fig. 3. n° 1. if the power at *A* be 1, that at *B* is 3, and at *D* 27. And with the combination, *ibid.* n° 2. which consists of 20 sheevers, five on each pin, one man may raise a ton weight.

The force of the pulley may also be easily shewn by comparing the velocities of the power and weight; for it is evident, if the weight *W* (*ib.* n° 4.) be raised one

inch, each string *H E*, *D B*, will be shortened one inch, and consequently the string *A P* will be lengthened two inches; and so *P* will pass through twice the space that *W* does, in the same time: consequently the tackle of pulley, in the form of n° 5. will increase the power five times; and that of fig. 7. and 8. will increase it six times.

In the disposition of pulley according to n° 10. it is plain, since each pulley has a fixed rope, it must be considered as a lever of the second sort, and so will double the power of the foregoing pulley; and so four pulleys will increase the power sixteen times.

Though the last-mentioned form be of the greatest force from the same number of pulleys; yet, if we consider the simplicity, force, and conveniency of the tackle of pulley altogether, none is superior to that of the form of n° 9. where the uppermost pulley is fixed, and each has a rope annexed to the weight; its power is therefore thus estimated: when the weight *W*, is raised one inch the rope *A B* will be lengthened as much; and so the pulley *C* will descend one inch, by which means the rope *C D* will be lengthened two inches, and one by the rising of the weight *W*; wherefore the pulley *E*, will descend three inches; and thus the rope *E P*, will be lengthened six inches by that means (*viz.* three on each side) also, the rising of the weight will cause it to lengthen one inch more, so that the power *P*, goes through seven inches, while the weight *W*, rises one: therefore, $P : W :: 1 : 7$. And thus you proceed for any other number.

PULMO, the LUNGS, in anatomy. See the article LUNGS.

PULMO MARINUS, or SEA-LUNGS, a name given by some naturalists to a species of medusa, which seems a mere lump of whitish semi-pellucid jelly. See the article MEDUSA.

It is found in great abundance, floating on the surface of the water, about Sheppey-island, in Kent.

PULMONARIA, SAGE OF JERUSALEM, in botany, a genus of the pentandria-monogynia class of plants, with a monopetalous flower divided into five obtuse and erecto-patent segments at the limb: there is no pericarpium, the seeds, which are four, being contained in the calyx unaltered. See plate CCVIII. fig. 6. The leaves of sage of Jerusalem are accounted pectoral and cardiac, and therefore

fore good in all disorders of the lungs. **PULMONARY VESSELS**, in anatomy, are arteries and veins, which carry the blood from the heart to the lungs, and back again from the lungs to the heart. See the article **ARTERY**, &c.

The pulmonary artery arises from the right ventricle of the heart, and is distributed only through the lungs, but with a vast number of ramifications. See the article **LUNGS**.

The pulmonary vein arises from the left ventricle of the heart, where it first forms a sinus, then is divided into four branches, and afterwards into innumerable ones, which are distributed through the whole substance of the lungs.

PULMONARY CONSUMPTION. See the articles **CONSUMPTION** and **PHTHISIS**.

PULP, in pharmacy, the fleshy and succulent part of fruits, extracted by infusion or boiling, and passed through a sieve.

Some physicians also use the term pulp for the fattest, fullest, and most solid part of the flesh of animals. See **FLESH**.

PULPIT, *pulpitum*, an elevated place in a church, whence sermons are delivered: the french give the same name to a reading desk.

Among the antient Romans, the term *pulpitum* signified the stage of a theatre; or, according to some, an eminence on the stage, for the music; or a suggestum whence declamations, &c. were spoke.

PULSATILLA, the **PASQUE-FLOWER**, in botany, a genus of the polyandria-polygynia class of plants, the flower of which consists of six plane, erect, acuminate, and long petals; there is no pericarpium; the seeds, which are numerous, compressed, and hairy, being disposed on an oblong, capitated, and hairy receptacle. See plate **CCXI**. fig. 3.

PULSE, *pulsus*, in the animal œconomy, denotes the beating or throbbing of the heart and arteries. See the articles **HEART** and **ARTERY**.

No doctrine has been involved in more difficulties than that of pulses; since, in giving a physiological account of them, physicians have espoused quite opposite sentiments; whilst some doubt whether the pulse is owing to the systole or diastole; as also, whether the motion of the heart, and arteries, is one and the same, for a moment of time. See the articles **SYSTOLE** and **DIASTOLE**.

With regard to motion, the pulses are reckoned only four, great and little, quick and slow. When quickness and great-

ness are joined together, it becomes violent; and when it is little and slow, it is called a weak pulse. They are also said to be frequent and rare, equal and unequal; but these are not the essential affections of motion. Frequency and quickness are often confounded with each other. A pulse is said to be hard or soft, with regard to the artery, according as it is tense, renitent, and hard, or flaccid, soft, and lax; for the disposition of the arteries contribute greatly to the change of the pulse; wherefore it sometimes happens, that the pulse in both arms is not alike, which is very common in a hemiplexy. Add to these a convulsive pulse, which does not proceed from the blood, but from the state of the artery, and is known by a tremulous subsultory motion, and the artery seems to be drawn upwards: this in acute fevers, is the sign of death; and is said to be the pulse in dying persons, which is likewise generally unequal and intermitting. A great pulse shews a more copious afflux of the blood to the heart, and from thence into the arteries; a little pulse, the contrary. See the article **CIRCULATION**.

The pulses of persons differ according to the largeness of the heart and vessels, the quantity and temperies of the blood, the elastic force of the canals; as also with regard to the sex, age, season, air, motion, food, sleep, watchings, and passions of the mind. The pulse is larger and more quick in men than in women; in the bilious and sanguineo-bilious, than in the phlegmatic and melancholic. Those who are lean, with tense fibres, and larger vessels, have a greater and a stronger pulse, than those that are obese, with lax fibres and small vessels; whence they are more healthy, robust, and apt for labour. In children, the pulse is quick and soft; in adults, greater and more violent. In the old, it is commonly great, hard, and slow. Labour, motion, and exercise of the body increase the circulation of the blood, the excretions, and particularly respiration; rest renders the circulation slow and weak; intense speaking increases the circulation, and consequently renders the pulse large and quick. In watching, the pulse is more evident; in sleep, more slow and languid. After drinking hot things, such as coffee and tea, or hot bath-waters, as well as after meals, the pulse vibrates more quick. But nothing produces a greater change in the pulse than affections of the mind: in terror it

is unequal, small, and contracted; in joy, frequent and great; in anger, quick and hard; in sadness, slow, small, deep, and weak; and in intense study, languid and weak. With regard to the air, when after the predominancy of a west or south-wind, it becomes north or east, the pulse is stronger and larger; as also when the quicksilver rises in the barometer. But when the atmosphere is dense, humid, rainy, with a long south-wind; as also where the life is sedentary, the sleep long, and the season autumnal, the pulse is languid and small, and the perspiration decreased. In May it is great, and sometimes violent; in the middle of summer, quick but weak; in the autumn, slow, soft, and weak; in the winter hard and great. A drastic purge and an emetic render the pulse hard, quick, and weak, with loss of strength; chalybeates, and the bark render it great and robust, and the complexion lively; volatiles amplify and increase the pulse; acids and nitrous remedies refrigerate the body, and appease the pulse; opiates and the like, render it small and weak, and decrease the elasticity of the solids; whereas things abounding with a friendly sulphur increase the pulse; but poisons render it small, contracted, and hard. When the quantity of the blood is too great, bleeding raises the pulse.

The several indications of the pulse in different disorders, may be seen under the respective names of these diseases.

PULSE is also used for the stroke with which any medium is affected by the motion of light, sound, &c. through it. See the articles **MEDIUM**, **LIGHT**, &c.

Sir Isaac Newton demonstrates, that the velocities of the pulses in an elastic fluid medium (whose elasticity is proportionable to its density) are in a ratio compounded of half the ratio of the elastic force directly, and half the ratio of the density inversely; so that in a medium whose elasticity is equal to its density, all pulses will be equally swift.

PULSE, *legumen*, in botany, a term applied to all those grains or seeds which are gathered with the hand, in contradistinction to corn, &c. which are reaped, or mowed: or it is the seed of the leguminous kind of plants, as beans, vetches, &c. but it is by some used for artichokes, asparagus, &c.

PULSION, the act of driving, or impelling a thing forwards.

PULTOWAY, or **POELTWA**, a town of

Russia, in the province of Ukraïn, situated in east long. 35°, north lat. 50°.

PULVERIZATION, *pulverizatio*, the art of pulverizing, or reducing a dry body into a fine powder; which is performed in friable bodies, by pounding or beating them in a mortar, &c. but to pulverize malleable ones, other methods must be taken. To pulverize lead, or tin, the method is this: rub a round wooden-box all over the inside, with chalk; pour a little of the melted metal nimbly into the box; when, shutting the lid, and shaking the box briskly, the metal will be reduced to powder. See the article **GRANULATION**.

PULVINATED, in the antient architecture, a term applied to a frieze which swells or bulges out in the manner of a pillow.

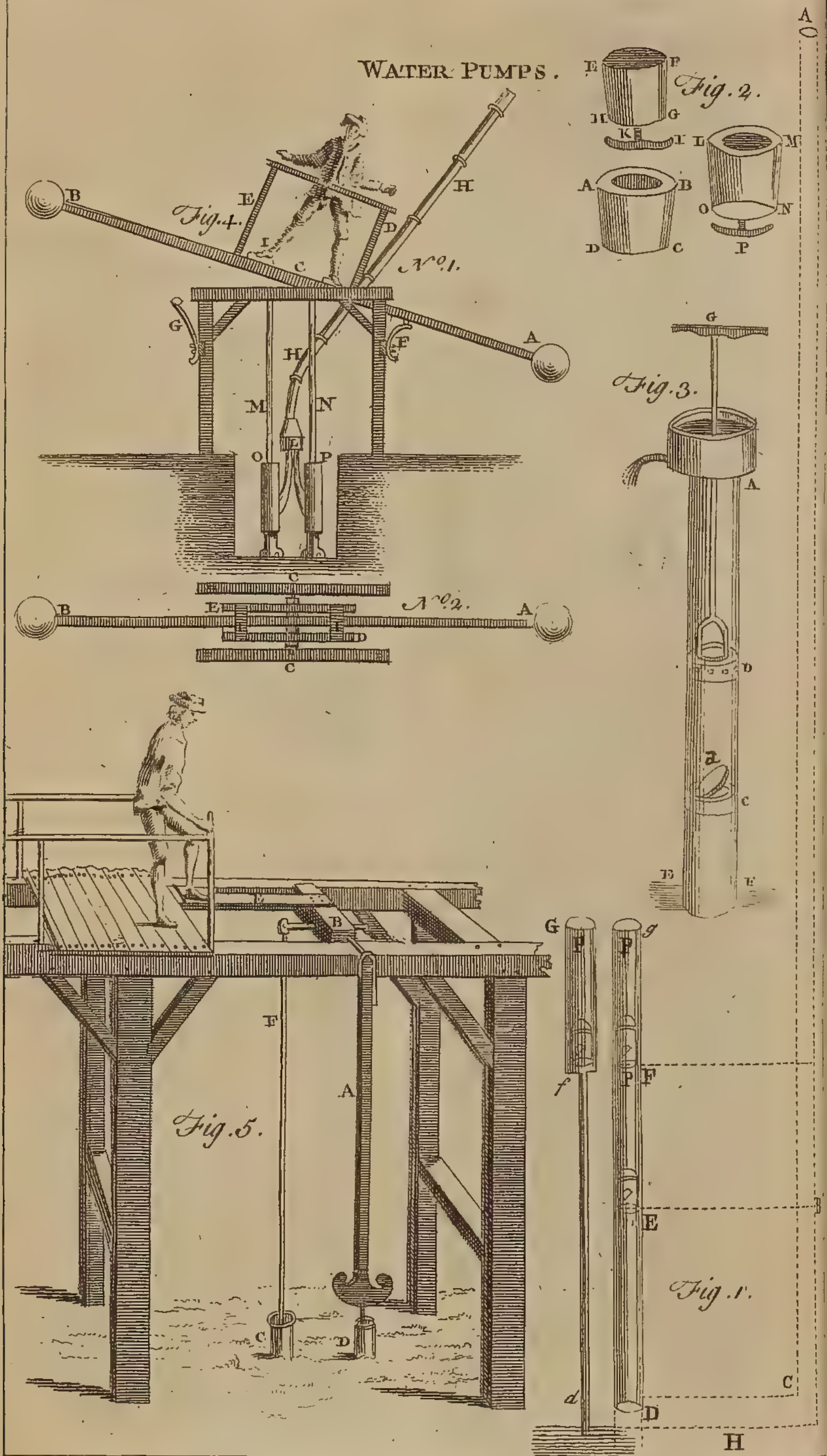
PULVIS, a **POWDER**. See **POWDER**.

The operation of reducing medicines into powder is so very simple in itself, that it requires no other skill than having those things which come under its management sufficiently dry, in order to be so divided. In judging of the fitness of materials for this treatment, only these two considerations necessarily require our attention. The first is, whether the things themselves are thus reducible without any previous management that may hurt their medicinal virtues? and next, whether their virtues are conveniently preserved in this form, when reduced into it? Under the first of these it naturally occurs, that viscid and oily substances cannot be thus managed without first reducing them to some brittleness, which cannot be done without drying: if such things, therefore, cannot be sufficiently dried for triture, without exhaling their better parts, or destroying that particular quality for which the simple is valued in medicine, as it happens with many seeds and gums, they are much better in any other form than this. The other requisite in this form, relating to the preservation of things reduced into it, directs not to prescribe materials therein which are volatile, or will any other way change in the open air. The preparations, intentions, &c. of the several powders used in medicine, may be seen under their several heads. See the article **POWDER**.

PULVIS FULMINANS, among chemists, a powder so called from its smart and loud explosion, when it begins to melt after being placed upon an iron-plate over a gentle fire. It is prepared thus: take
three



WATER PUMPS.



J. Jeffries sculp.

three ounces of purified nitre, two ounces of salt of tartar, and one ounce of brimstone, and grind them well together in a mortar; then putting a small quantity, as about half a dram, over the fire, in the manner already mentioned, it will make a great explosion. The more philosophical way of accounting for this effect of the pulvis fulminans is, according to Dr. Shaw, by supposing that the acid spirits of the nitre and sulphur being loosened by the heat, rush towards one another, and towards the salt of the tartar with so great a violence, as by the shock at once to turn the whole into vapour and smoke.

PUMICE, in natural history, a slag or cinder of some fossil, originally bearing another form, and only reduced to this state by the action of the fire, though generally ranked by authors among the native stones. It is a lax and spongy matter, frequently of an obscure, striated texture in many parts, and always very cavernous and full of holes; it is hard and harsh to the touch, but much lighter than any other body that comes under the class of stones. It is found in masses of different sizes, and of a perfectly irregular shape, from the bigness of a pigeon's egg to that of a bushel. We have it from many parts of the world, but particularly from about the burning mountains *Ætna*, *Vesuvius*, and *Hecla*, by whose eruptions it is thrown up in vast abundance; and being by its lightness supported in the air, is carried into seas at some distance by the winds, and thence to distant shores. The great use of the pumice among the antients, seems to have been as a dentifrice, and at present it is retained in the shops on the same account.

Pumice-stones, on being imported, pay a duty of 2s. 6⁸⁰/₁₀₀d. the ton; and draw back, on exportation, 2s. 3d.

PUMMEL. See the article **POMMEL**.

PUMP, *antlia*, in hydraulics, a machine formed on the model of a syringe, for raising of water. See **SYRINGE**.

The theory of pump-work depends, in a great measure, upon the properties of the inverted syphon; thus let *A B C D E F G* (plate CCXVI. fig. 1.) represent an inverted syphon, *A B C D* a column of air, and *D G* the lower part of the pipe of a pump immersed in the water of the well *H I*. Let *P* be the piston of the pump at *E* in its lowest situation; and at *F* in its highest. Now as both

these parts communicate with the water, one by pressing on it, the other by opening into it, they may be looked upon as communicating with one another. Wherefore *A B C D*, the column of air, would by its weight or pressure force up a column of water into the pipe *D G* to the height of thirty-two feet, were the air exhausted from the said pipe, and continued to that height; since the weight of a column of air is equal to that of such a column of water of the same base. If, therefore, the piston *P* be thus thrust down to *E*, meeting the water there, and from thence it be raised to *F* with an uniform motion, the water will rise from *E* to follow the piston with a variable motion; the least of which is as $\sqrt{A C - D E}$, and the greatest as $\sqrt{A C - D E} = \sqrt{A B}$.

If in lifting up the piston, the velocity of the water be less than that of the piston, it will not be able to follow it; but will leave a space between them, which will increase more and more as the velocity of the water becomes less than that of the piston. The consequence of this will be, that a part of the stroke of the piston will be lost; and not only that, but the piston, when the water leaves it, will rise very hard, as having a weight of water upon it, and the air of greater density above than below; whence the equilibrium, which ought to be in pumps, is destroyed, and the ballance against the workman. Now as this can happen even where the diameter of the sucking-pipe is equal to that of the pump-barrel, it must happen much sooner when the sucking-pipe is less than the barrel; because the water rising through a less passage will be longer in filling the pump-barrel, and consequently must quit the piston, and leave the greater void space between. On the contrary, if the least velocity of the water, rising into the pipe, be greater than that of the piston, there will be no void space; and the pump-barrel may be made in proportion as much wider than the sucking-pipe, as the velocity of the water is greater than that of the piston. Now that this may be the case, we shall shew by calculation what diameters the barrel and pipe ought to have, compared with the velocity of the water and piston. Let *A* (*ibid.*) represent the least altitude of the atmosphere $A C = 31$ feet of water; $B = D F$ the highest elevation of the piston above the surface of the water

water HI, which let be 16 feet. And let the greatest velocity of the piston which can well be given to a pump be that of four feet in a second $=v$; and V = the least velocity of the water that rises in the pipe; D = the diameter of the barrel; and d = the diameter of the pipe.

Now here we have $\sqrt{A} - \sqrt{B} = V$ = the least velocity of water; and the fall which will produce that velocity is the square of that expression, viz. $A + B - 2\sqrt{AB}$, that is, $31 + 16 - 2\sqrt{31 \times 16} = 2$ feet 6 inches, the height of the fall required. Whereas, by the common way of taking the square of $\sqrt{A} - \sqrt{B}$, viz. $A - B$ for the height, we have 15 feet for the fall, which extraordinary error must be of very bad consequence in practice.

Here the velocity $\sqrt{A} - \sqrt{B} = \sqrt{31} - \sqrt{16} = 5,6 - 4 = 1,6$ per second. The velocity of the water, at the bottom of the pipe D, is as $\sqrt{A} = 5,6$; that also must be the velocity of the piston at D, that the water may follow it; whence the piston moving with the same velocity at F, where the velocity is but 1,6, we have $5,6 - 1,6 = 4$ feet of void space; therefore 4 parts in 5,6 of such a stroke, would be lost or ineffectual. We may here observe, by the way, that since the velocity of the water at D is 5,6, and the greatest velocity which can be given to the piston (without damaging the machinery) is but 4; therefore a piston, working at the lower end of the pipe or barrel, will always have water more than enough to prevent any void space or loss of labour. But, since we find so great a void in the pipe at F of the same diameter with the piston, it is evident, if we contract all the part below F into a small pipe as FD, and let the part FG remain as it was for the barrel for the piston to play in, as at FG, that then the water will rise into the barrel FG with a greater velocity than before; in proportion as the pipe is less; consequently, if the bore of the pipe FD be to that of the barrel FG, as the velocity of the piston P, or the water in the barrel, is to the velocity of the water in the pipe, there will always be a sufficiency of water to prevent a vacuum in the barrel. Which rule in symbols is thus expressed, $D^2 D : d^2 d :: V : v$; whence $D^2 v = d^2 V$ for a general canon; any three of which quantities being given, the fourth may be found. Thus, for exam-

ple, suppose D, v , and V were given to find d , we have $d = \frac{D\sqrt{v}}{\sqrt{V}}$. Let the

diameter of the barrel $D = 6$ inches; and suppose the piston gives 20 strokes in a minute, each a two feet stroke, spending as much time in its ascent as descent; then will the motion of the piston be 80 feet per minute, or $1\frac{1}{3}$ per second; whence $v = 1\frac{1}{3}$. Lastly, to obtain the value of V, we must fix on the length of the pipe FD (*ibid.*) which let be 16 feet; then the highest elevation of the piston will be 18 feet (if it comes to the bottom of the barrel, as it ought to do); wherefore, an height of water of 18 feet in the pump GD, acts against the weight or height of 31 feet in the leg AC. Now the velocity V of the water in the pipe FD being uniform, or constantly the same, we must find what difference of uniform velocities will be generated by falls from 31 and 18 feet heights. Thus $\sqrt{16\frac{1}{9}} : 32 :: \sqrt{31} : 43$ nearly; and $\sqrt{16\frac{1}{4}} : 32 :: \sqrt{18} : 32\frac{3}{4}$; whence the difference of these uniform velocities will be $43 - 32\frac{3}{4} = 10\frac{1}{4} = 10$ feet three inches per second; therefore $V = 10\frac{1}{4}$. Where-

fore $\frac{D\sqrt{v}}{\sqrt{V}} = d = 2\frac{1}{10}$ inches of the

diameter of the pipe FD.

The reason why we make no use of the expression $\sqrt{AC} - \sqrt{DF}$ in this case, is, because this gives only the difference of the instantaneous velocities, or the least velocity with which the water at F can begin its motion upwards; whereas we here want to find what the constant and uniform motion of the water will be, or how much it will supply every second uniformly, which is done by the method above. For, since a fall of $16\frac{1}{9}$ gives an uniform velocity of 32 feet per second, a fall of 31 feet will give 43; thus a fall of 18 feet will give $32\frac{3}{4}$, and their difference must be that of the water at F.

If we know the velocity of the piston v , the diameter of the barrel D, and the diameter of the pipe d , we shall find the velocity of the water in the pipe V,

$= \frac{v D D}{d d}$; or thus in words, multiply

the square of the diameter of the barrel by the velocity of the piston; divide the product by the square of the diameter of the pipe, the quotient will be the velocity sought

sought from the water in the pipe. This velocity, when found, must be taken from 43, the remainder $43 - V$ will be the uniform velocity produced by a fall from the highest situation of the piston to the lowest surface of the water in the well, and which is found by saying, as

$32 : \sqrt{16\frac{1}{9}} :: 43 - V : \sqrt{DF}$; whence DF , the highest elevation of the piston, will be known.

When we know D , V , and d , we find v the velocity of the piston by this theorem

$\frac{V d d}{D D} = v$; that is, in words, multiply

the square of the diameter of the pipe by the velocity of the water in it, and divide the product by the square of the diameter of the barrel, the quotient is the velocity of the piston required.

Having given the velocity of the water in the pipe V , the diameter of the pipe d , the velocity of the piston v , to find the diameter of the barrel D , we have this

theorem $D = \sqrt{\frac{V d d}{v}}$; that is, multi-

ply the square of the diameter of the pipe by the velocity of its water, and divide that product by the velocity of the piston; the square root of the quotient is the diameter of the barrel sought.

We shall now proceed to the description of two or three of the most useful pumps, but first give an account of that sort of valves which are exceeding good, and ought to be used in pumps, and all kinds of water-engines, where valves are necessary.

Let $A B C D$ (*ibid.* fig. 2.) be the bucket of a piston, or any other part where a valve is required; in the middle there is a circular but tapering hole from top to bottom, in which is fitted the tapering or conical piece $E F G H$, with a piece $I K$ to be screwed in and out of the bottom part $H G$. It is to be screwed out, when the said solid $E G$ is put into its place or hole in $A C$; and afterwards screwed in, when the whole together appears as in the figure $L M N O P$. The piece $E G$ now becomes a valve, or capable of permitting the water to ascend, and to prevent its descent.

That the water pushing against the bottom of the valve will raise it upwards, is evident from the conical form thereof, and its lying in the hole only by its own weight; the length of the key at K being sufficient to permit such a rise of the valve, as will admit a space between it

and the hole for the water to pass as freely as required; and, that the valve may not be thrown quite out of the hole, the cross piece I is added, of a greater length than the diameter of the lowest part of the valve.

If the valve $E G$ and its socket $A C$ be of brass, and fitted, by grinding them with emery first and putty afterwards, with a drill-bow into each other, they will not only be water-tight, but even air-tight; and that too, if but slightly touched with the emery or putty: for if they are ground to a polish, the attraction of cohesion will take place, and prevent the valve from rising so freely as it ought to do; yea, sometimes those surfaces have been found to cohere so strongly, that the force of the rising water could not overcome it; but all this would be prevented, and every thing succeed to one's wish, if they were made as above directed, as has been found by long experience and trying every way.

Kinds and structure of PUMPS. Pumps are distinguished into several kinds, according to the different manners of their acting; as the common sucking pump, forcing pump, lifting pump, mercurial pump, &c.

1. The structure and action of the common sucking pump, as it is called, has been so far described in the above theory of pumps, that little remains to be said on it. However, it may not be improper to give a figure, or two of this kind of pump, in order to shew its structure, and the contrivances used in working it. Fig. 3. *ibid.* represents a simple sucking pump, in which A is the cistern; $A B$, the barrel or pipe, standing in the water $E F$; $G D$, the piston and bucket, with its bucket and valve D ; and C , the valve open for the ascent of the water. Fig. 4. *ibid.* n° 1 and 2. is a very simple and useful contrivance for making two pumps by means of the ballance $A B$; having large iron-balls at each end, placed in equilibrio on the two spindles C , as represented in the figure; on the right and left are two boards I , nailed to two cross-pieces fastened to the axis of the machine. On these two boards, the person who is to work the pumps, stands, and supports himself by four posts, E, D , erected perpendicularly, and having cross-pieces on the top. At the distance of ten inches on each side of the axis, are fastened the pistons M, N , which go to the suckers. The man, by leaning alternately on his right and left foot, puts the

the ballance in motion, by which means the pumps O, P, are worked, and the water thrown into the pipe H, and carried to a height proportional to the diameter of the valves, and the action of the ballance. It will be necessary to place on each side an iron-spring, as F, G, in order to return the ballance, and prevent its motion from being too great. Fig. 5. *ibid.* is another machine for working two pumps, where A represents a large weight fastened to the axis, to regulate the motion of the machine. On each side of the axis B, is a piston which goes to the suckers of the two pumps C, D. The machine is put in motion by the man's treading on the board E, and, consequently, the two pumps deliver water alternately. All which is so plain from the figure, that it needs no farther description.

2. The forcing pump has already been sufficiently explained under the article FORCER.

3. The lifting pump is only a forcing pump of another structure, represented in plate CCXVII. fig. 1. where A B is a barrel, fixed in the frame K I L M; which also is fixed immoveable, with the lower part in the water to be exhausted. G E Q H O is a frame with two strong iron-rods, moveable through holes in the upper and lower parts of the pump I K and L M: in the bottom of this frame is fixed an inverted piston B D, with its bucket and valve upon the top at D. Upon the top of the barrel, there goes off a part K H, either fixed to the barrel, or moveable by a ball and socket, (as here represented at F) but in either case so very nice and tight, that no water or air can possibly get into the barrel, which would spoil the effect of the pump. In this part, at C, is fixed a valve opening upwards. Now when the piston-frame is thrust down into the water, the piston D descends, and the water below will rush up through the valve D, and get above the piston; where, upon the frame's being lifted up, the piston will force the water through the valve C up into the cistern P, there to run off by the spout. Note, this sort of pump is set so far in the water, that the piston may play below the surface of it.

Another excellent pump of the lifting sort, is represented, *ibid.* fig. 2. which has this peculiarity, that its piston works without friction. Its structure is this: A B C D E F G H I K L is a kind

of a box inclosing the piston; this box consists of two parts, *viz.* one upper, A B C I K L, and the under one, D E F G H, which shut upon each other. The piston within, *ab*, is a circular piece of wood; about the circumference of which is nailed a piece of well-seasoned leather, of a circular form, and so wide, that when the piston is placed at the bottom of the box, the leather may lie over the sides thereof at D H all around. The piston and leather, thus placed on the upper part, is forced down upon the under one, and then both parts screwed very fast together. The manner of which is very easy to apprehend from the figure, where *igf d b k* is the leather going from the piston through the jointure of the box. Upon the upper part of the piston is fixed a circular (or any figured) piece of iron or wood, denoted by *def*, in the top of which, at *e*, is fixed the rod of the piston Q C, by which the piston is drawn up towards the upper part of the cavity *ln*, and from thence forced down again in working the pump. Now as the diameter of the piston is less than that of the cavity, it is plain that in its motion up and down no friction can happen, as there are no parts for it to rub against, which is occasioned by the contrivance of suspending it on the leather. In the bottom part is fixed a pipe, F O, to bring up the water from the mine or well at O, which it delivers into the box by a valve at *c*. In the middle of the piston is likewise another valve *m*, opening upwards. A M N L is a tube or cylindric pipe, in which the water is raised to a cistern to run off. It is easy to observe, that as the piston is drawn up, the water will run in beneath, through the valve *c*, to prevent a vacuum; and also, that when the piston is forced down, the water in the lower parts must be forced up through its valve; and when the piston is raised again, the water above it will be forced up the pipe A M to the cistern. Another thing peculiar to this pump is, the shortness of the stroke of the piston, which is compensated by the largeness of its area, and the greater number of strokes that may be made in the same time. The only objection to this pump is, that it is always charged with the weight of so much water, as is equal to a column of water, whose base is equal to the area of the piston, and the height equal to that of the reservoir.

4. The mercurial pump, or that which works

PUMPS.

Fig. 3

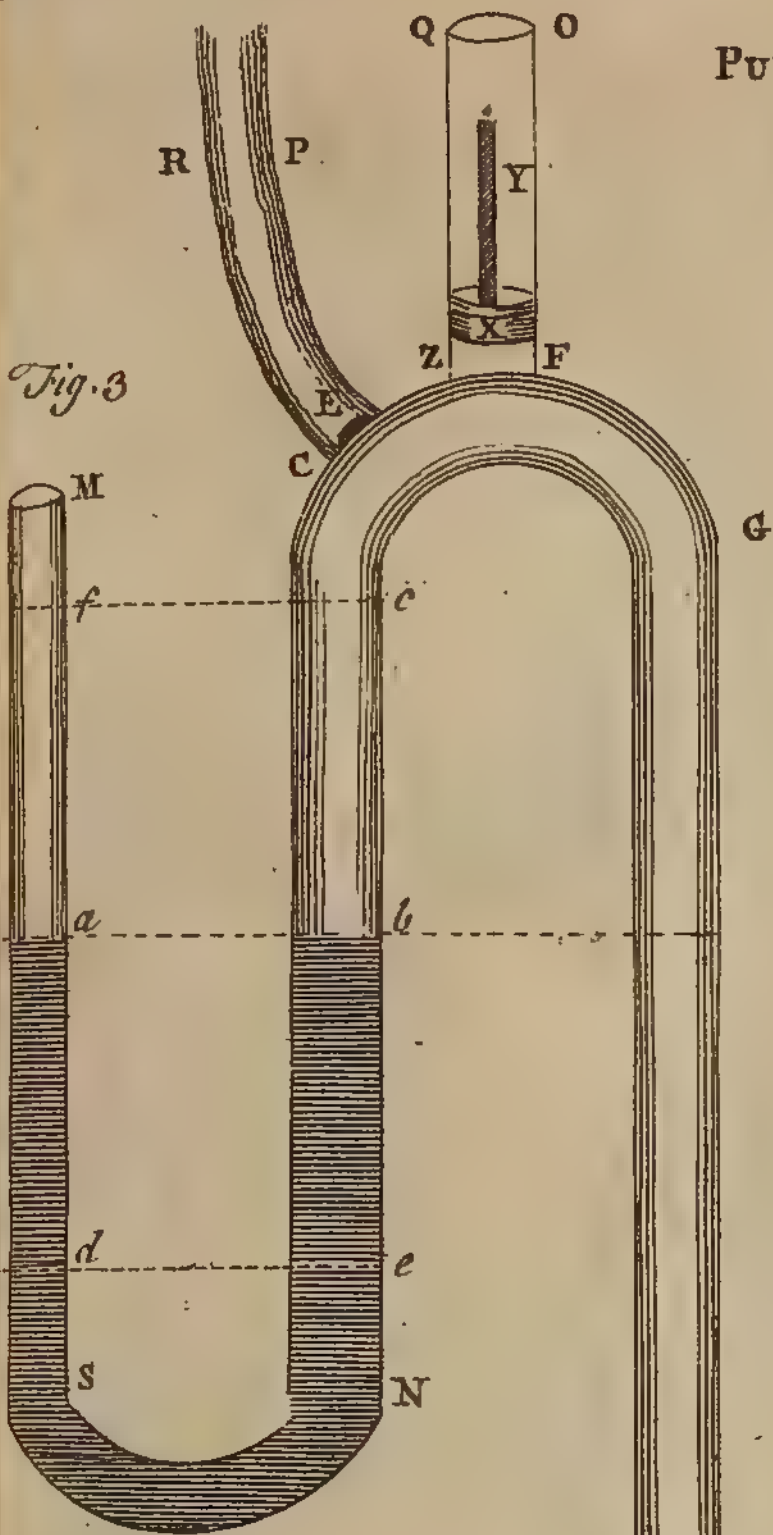


Fig. 4

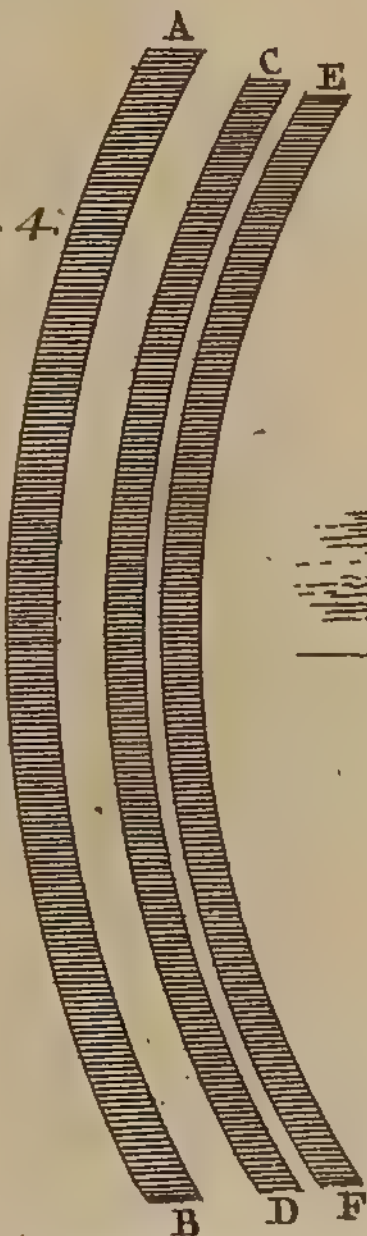


Fig. 1

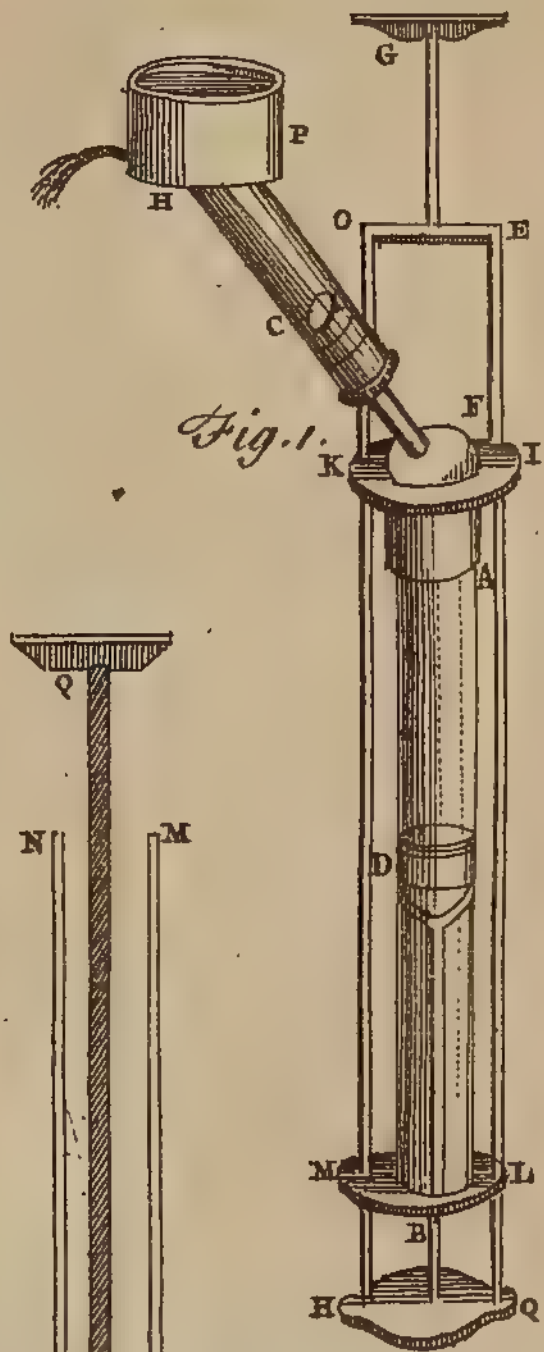
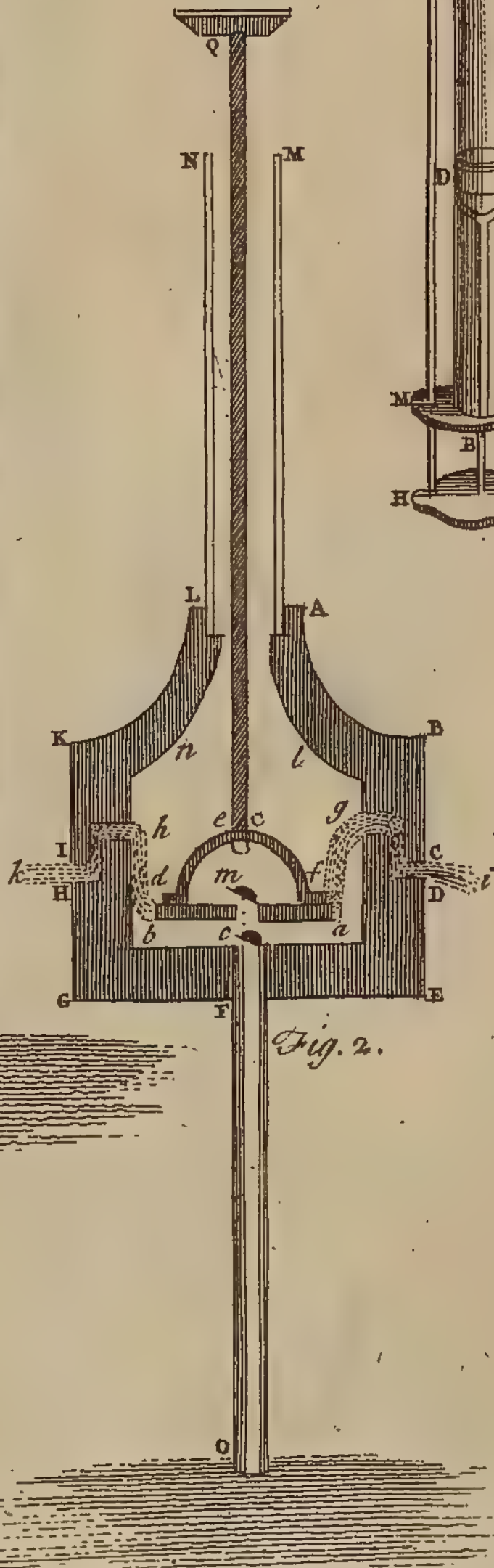
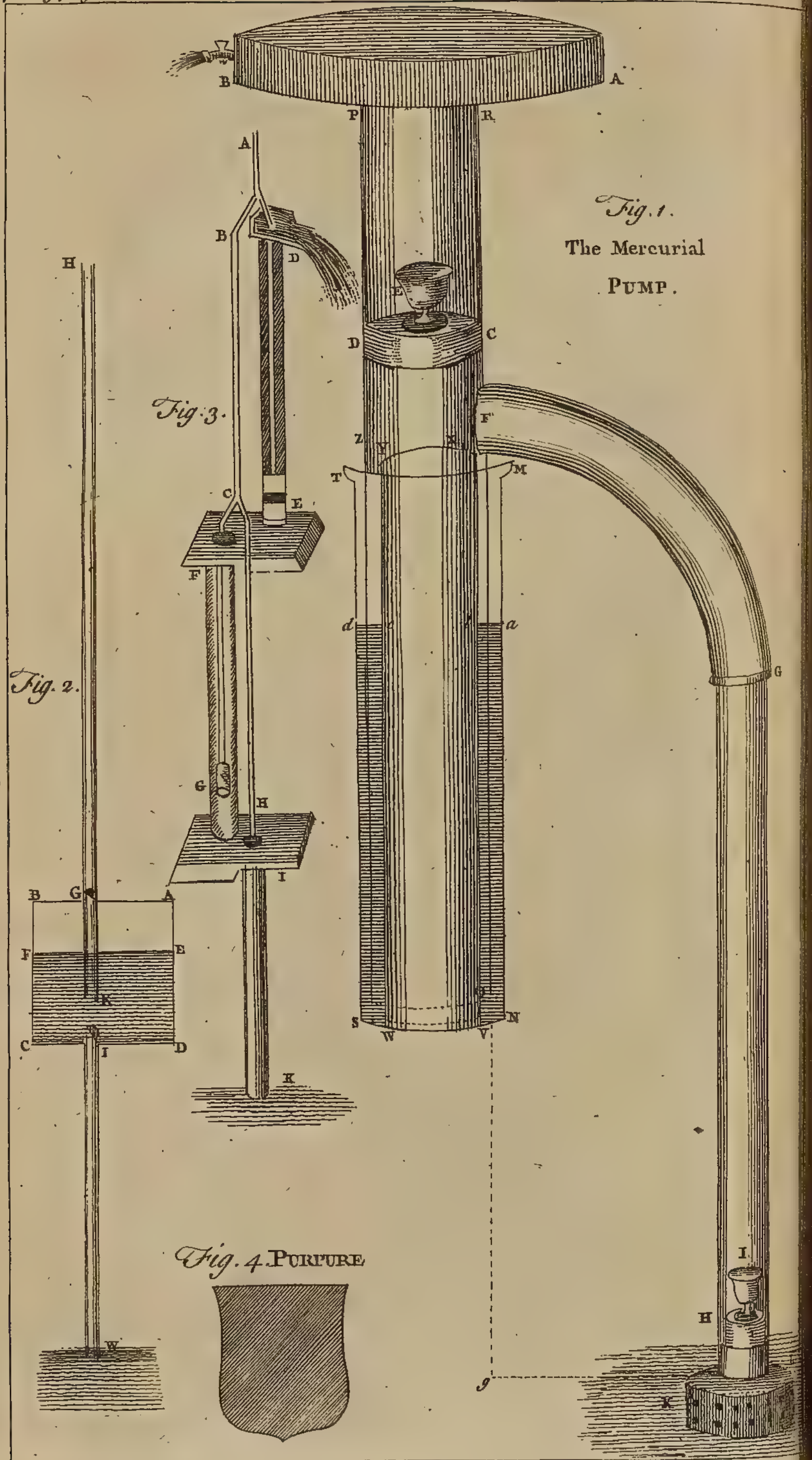


Fig. 2





T. Jefferys sculp

works by quick-silver, being one of the most curious of the modern inventions, we shall be the more full in its description, which is taken from a model. A B (plate CCXVIII. fig. 1.) is a cistern placed on the top of a brass-tube POQR, open at each end P R and O Q. Towards the upper part of the tube at F is inserted (or soldered) a curved pipe F G, opening into the tube at F; and in the end G is cemented a glass-tube G H, fixed below in an hollow box L K, full of holes for the admission of water, into which it is immersed. M N S T is an exterior tube, open at the top M T, and close at the bottom N S; in which bottom is firmly fixed another hollow tube V X Y W, close on the top X Y, which may be a solid piece of wood. This inner tube or cylinder of wood goes up into the tube Q O R P, at the same time that this is invested by the exterior tube M N S T, as is seen in the figure. In the lower part of the pipe at H is a diaphragm, and a valve I, opening upwards for the ascent of water when a vacuum is made. At C D in the main tube, above the insertion of the pipe, is another diaphragm and valve E, opening upwards also to give passage to the water in the forcing part of the stroke.

Now to explain the peculiar manner of working by quick-silver, which for that purpose is poured into the exterior tube M S, which, when applied to the pump in its place, will be made to rise in two cylindric shells; one about the tube of the pump outwardly; the other within, about the innermost tube or plug X Q, as represented in the figure at *a*, *b*, and *c*, *d*. At the bottom there is but one cylindric shell, because the middle tube does not reach the bottom, leaving the space V O Q W.

From this account it is easy to observe, that the part C O Q D answers to the barrel of the common pump, F G H to the pipe, the inner tube X Q to the piston, and the quick-silver at bottom to the leathers of the common piston; for it prevents all communication of the external air and internal part of the barrel, where the vacuum is to be made. Whence it is evident, that upon letting down the outer tube M S, it carries down the inner tube X Q at the same time, and makes a larger space in the barrel and pipe, in which the air will be expanded or become rarer, and its spring thereby weakened. In consequence of

this, the water will rise through the valve at I into the pipe, and also the mercury will rise in the inner shell by the pressure of the air on the outer shell, till the equilibrium be restored: and the height of the water raised will be nearly 14 times as great as that of the mercury. When the tube S M is raised again, the air will be compressed within the barrel; and, its spring increasing, it will act upon the water, the mercury of the inner shell, and the valve E; the water above the valve I it cannot move, because of the valve being shut below; its whole force is therefore spent on the mercury, and valve E; it will act on the inner shell of mercury, and drive it down to the level of that in the outer shell, as at *a b*, *c d*; and then the pressure will be every where equal, viz. on the inner and outer shell, and on the valve E: as the tube after this continues moving up, the air will be farther compressed, and its spring made greater than that of the outward air, which therefore it will overcome, and so thrust up the valve E, till so much has escaped as leaves the remainder in equilibrio with the atmosphere. The two shells of mercury will be upon a level all the while the air is going through the valve, because the pressure is not greater within than without. By repeating the operation a second time, the air will be farther rarified, and the water will again rise in the pipe; and thus on, till the pipe and barrel be full as in the common pump.

This pump made for common use, should have the following dimensions: the length of the outer tube M N = 30 inches, of the inner tube X O = 31 inches, the diameter of the inner tube X Y or Q O = six inches, the thickness of the outer tube = $\frac{1}{10}$ of an inch, of the middle one $\frac{8}{100}$ of an inch, and of the inner one $\frac{13}{100}$ of an inch, and the bottom of the tube Z O to come within an inch of the bottom, N S, of the outer tube. These dimensions afford sufficient strength, if the tubes or barrels are made of copper, or cast iron, and of such a diameter, that the distance between each may be $\frac{1}{2}$ the tenth of an inch, and this should be nicely effected, by having the tubes truly turned in a lathe. A transverse section of a part of the circumference of these tubes, with their thicknesses and the spaces between, is represented in plate CCXVII. fig. 4. where

where AB is the outer, CD the middle, and EF the inner tube. The spaces between are made so narrow, because otherwise too great a quantity of mercury would be necessary; and yet of no manner of use, because fluids press according to their altitude and not the quantity.

If now every part be fitted for work, and mercury poured in to the height of 24 inches, as shewn at *aNSd*; and the barrel and pipe be filled with water, so that the whole pump be full and in equilibrio with the atmosphere; and if the outer tube be moved down 14 inches at the commencement of the motion, the equilibrium in the pump is destroyed by the greater space, which will ensue upon the descent of the tube *XQ*, and which cannot be suffered, because of the pressure of the air on the water at *H*, and on the mercury in the outer shell at *a, d*. And because the pressures of the air outwardly at *H* and *a* are equal, but there is not an equal pressure inwardly on the valve *I*, and the inner shell of mercury *b, c*; and the valve being pressed with all the water in the pipe above it, which is proportional to the altitude *bg*; and the surface of the mercury of the inner shell at *b, c*, being pressed only with the altitude of water *Cb*, it is plain the water will not rush in at *I*, till the pressure on *b, c*, becomes equal to it; and that will be, when the height of the inner shell at *b* is greater than that of the outer shell at *a* by near $\frac{1}{14}$ part of the difference of the altitude *bg*; and then the pressure being equal at *b* and *I*, upon the motion of the tube *XQ* downwards, the water will be forced up through the valves at *I*, and the height of the mercury in the inner shell will always exceed that in the outer shell, in such manner, that the excess will be about $\frac{1}{14}$ of *bg*, or the height of the point *b* above the water at *H*.

When the other tube is in its lowest situation, the mercury in the inner shell will be nearly at the top, *XY*; and in the outer shell it will have but a small height as *aO*, or *Qd*. And when the tube *MS* is drawn up again, the inner tube, *XW*, will force the water in the pump to act upon the upper part of the valve *I*, the under part of the valve *E*, and the surface of the mercury at *b*, in the inner shell. The valve *I* is thereby shut close, the valve *E* it endeavours to push up but cannot, till it has first reduced the mer-

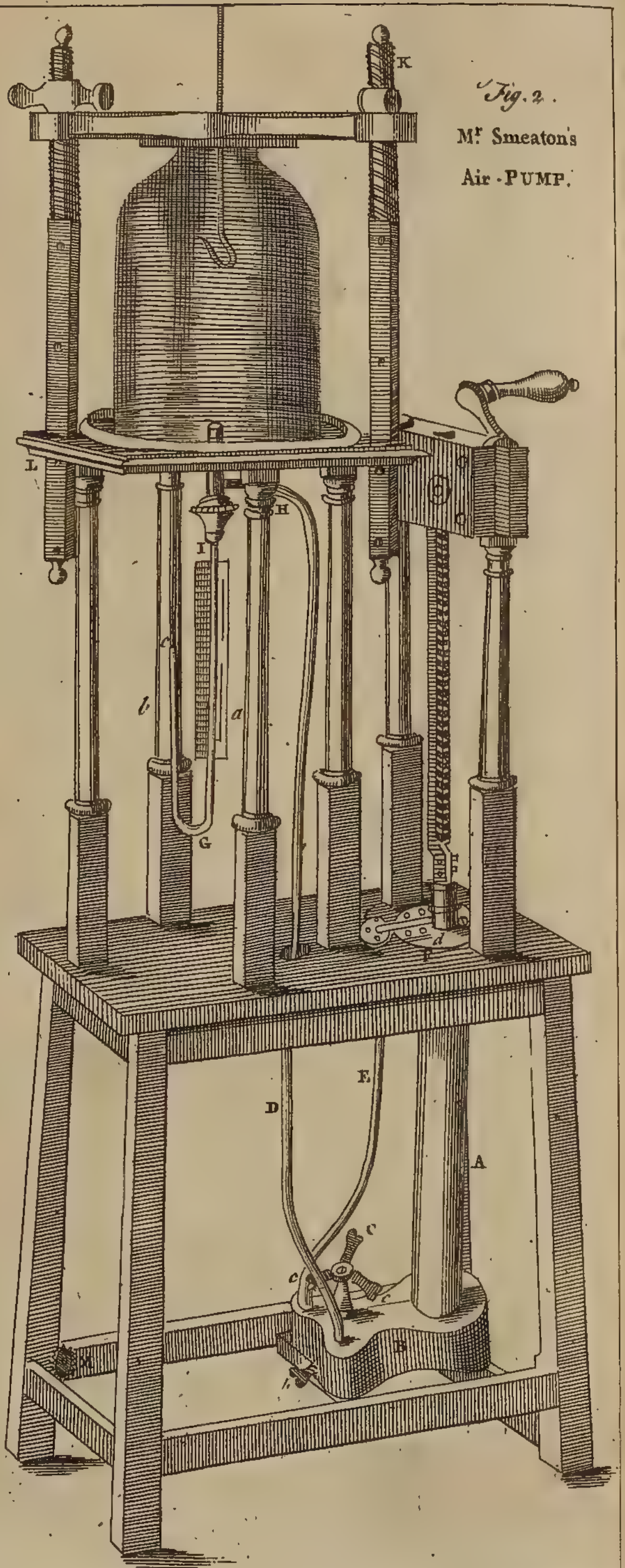
cury in each shell to a level; after which, as the tube *MS* continues its motion upwards, the mercury will rise in the outer shell, the pressure on the inner one being now greatest: and for every 14 feet the water is forced above the surface of the inner shell, *b*, the mercury will rise in the outer one 1 foot.

The theory of the operation of this complex pump will be much more easily understood from considering the syphon, *HGFZNSM* (plate CCXVII. fig. 3.) which, though very simple, acts on the very same principles. *HGF* is the water-pipe, as in the pump; *ZN* represents the inner cylindric tube, and *MS* the outer one; *OFZQ* is the barrel in which the piston *YX* moves (which is a forcer, or without a valve,) and *CR* a conduit-pipe to carry away the water forced through the valve *E*. In all this it is easy to see the analogy between this syphon and the mercurial pump. Its operation likewise is the same.

For let mercury be poured into the legs *MS* and *ZN*, it will come to a level at *a, b*. Now suppose the other part of the syphon full of water, and the piston raised, it is plain the water at *H* cannot open the valve *I*, till a column of mercury be raised in the leg *ZN* above the surface of that in the outer leg *MS*, sufficient to ballance the weight of the water in the pipe *HF*; then will the pressure of the air be equal upon the water *H*, and the mercury in the leg *MS*; and as the motion of the piston is continued, the water and mercury will continue to rise with equal momenta, and therefore the mercury will rise 1 inch for every 14 inches nearly, till the piston stops.

When this happens, the surface of the mercury in the leg *ZN* will be at *c*, and that in the leg *MS* at *d*; and now, if the piston be pushed down again, it will cause the water to shut the valve *I*, and to act on the mercury at *c*, and on the valve at *E*, but the pressure of the air at *E* will not suffer the valve to rise till the pressure there be greater within than without, which it cannot be till the surface of mercury in the outer leg *MS* be higher than that in the inner one; wherefore, before the valve *E* can open, the mercury in each leg must come again to the level *a, b*; after which, the mercury will rise in the outer leg *MS*, so as to be always in equilibrio with the water in the conduit-tube *RC*, and the part *Ce* of the inner leg;





leg; supposing the mercury now stands at *e* in that, and at *f* in the other: and then the said height of the water will be nearly 14 times the height *df*, or *ce*. All this is very easy to understand from the common principles of hydrostatics; and if this be understood, the nature of the pump must, as being the very same machine with a different disposition of its parts.

From this theory of the mercurial pump, it is easy to infer, that in constructing one, the part *Z F O Q* ought to be placed in the middle of the height from the water *H* to be raised, to the cistern *A B* which receives and delivers it; or more nicely, the level surface *abcd* of the mercury when the pump is full, and just going to work, ought to be in the middle point of the line *R g*; the reason is, because in the descent and ascent of the tube *M S*, the differences between the altitudes of the outer and inner shells *ad* and *cb* are equal, and in each case a 14th part of the height of the water below or above it.

Suppose the whole height from the water to the piston be *R g* = 60 feet; then *a R* = *ag* = 30 feet, or 360 inches; then also 14)360(26 nearly, that is, the difference of the altitudes in the mercurial shells will be about 26 inches. The place therefore where they ought to be on a level is at least 13 inches below *M*, or the quick-silver must never be poured in to a height *N a* greater than about 15 or 16 inches, or 17 at most. If the height *R g* be greater than 60 feet, the tubes *M S*, &c. must be proportionably enlarged.

General observations on PUMP-WORK.

From what has been said under the articles *FLUID*, *ATMOSPHERE* and *GRAVITY*, we presume the reason will appear sufficiently evident, why no single pump, though perfectly tight, can raise water by a piston playing at a greater distance than 32 feet; nor can this be remedied by several valves in the pipe below the piston, as some have pretended: for let *A B* (plate *CCXIX*. fig. 1.) be the barrel of a pump, *G F* the piston, *B E* a pipe going from the barrel to the water at *E*, 60 feet below it; and let *B*, *C*, *D*, *E*, be 4 valves placed in the pipe at 20 feet distance from each other. Now when the piston is drawn up from *B* to *F*, a vacuum will be made between, but the valve *B* will not rise by the water below it; for the water in the part *B C* cannot rise itself, much less can that in

the part *C D* below it, as being pressed with the weight of the column above, and its own weight downwards, therefore no part of the watry column *B F* can move of itself, or by itself. Now no power can be applied any where but at *E* to move the whole column; nor can the whole be moved without raising all the valves at once; therefore the power able to raise the valve at *E*, and consequently the valve at *B*, must be able to overcome the pressure of a column of water 60 feet high: but the air can sustain a column only of 32 feet high; therefore the air cannot raise the valve *E*, nor any of the rest; and consequently, the water cannot rise in the barrel *A B* of a single pump, if longer than 32 feet.

However, we may raise water by a compound-pump, such as is represented in (plate *CCXVIII*. fig. 3.) where *A* is the rod of the piston, which at *B* is divided into two, one of which goes to the barrel *D E*, and draws up the water from the cistern *E F*; the other part *B C* goes down to the said cistern, where it is divided at *C* into two other parts; one going to the pump *F G*, supplies the water to the cistern *E F*; the other part *CH* goes to another pump *I K* below, and draws up the water from *K* to the cistern *H I*. Now these pumps all working at once, will draw water from any depth, provided each pump does not exceed 32 feet in height.

We shall conclude this subject with an account of one other method of raising water, by the natural agency of heat and cold only. It is as follows: *A B C D* (*ibid*. fig. 2.) is a pretty large vessel filled with water to the height *E F*, the space above being full of air. On the upper part of the vessel is a tall tube inserted *G H*, and descends below the surface of the water to *K*. On the nether part is another tube or pipe *I W*. In each tube is a valve opening upwards, as at *I* and *G*. The body of this instrument being nicely closed every where, so that no air can escape, and placed with the lower end in the water *W*, and thus continued in the hot sun of a summer's day, the air will be rarified by the heat of the sun in the upper part, and will compress the subjacent water, and force it up through the valve *G* into the tube *G H*, and by the cold of the following night it will be condensed again; and then the pressure of the atmosphere will force the water at *W* up the pipe *W I*, to replenish the

vessel each day: and, in this manner, may water be raised in a considerable quantity in the summer season, and in hot climates.

By such a contrivance, several curious effects may be produced: for by using a cylindrical cover to the vessel, the sun-beams may be collected in such quantity, as to greatly rarify the air contained in it, so as to make it force out a considerable stream of water either through a tube or adjutage: thus also, an image may be made to weep in the sun-beams, or at the approach of fire; with other devices of the same kind.

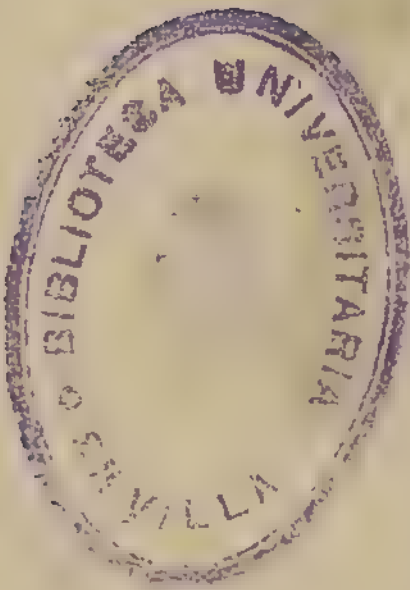
Air-PUMP. Having already given the description of the common air-pump, and also that of the portable one, under the article *AIR*, it only remains to give an account of some considerable improvements made in that machine by the ingenious J. Smeaton; together with a perspective view thereof, in plate CCXIX. fig. 2. and also a perpendicular section, &c. of it in plate CCXX. fig. 1, 2, &c.

One of the principal causes of imperfection in the common air-pumps, arises from the difficulty of opening the valves at the bottom of the barrels; to avoid which inconvenience, Mr. Smeaton has made use of seven holes instead of one; by which means, the valve is supported at proper distances, by a kind of grating, made by the solid parts between these holes: and to render the points of contact, between the bladder and grating, as few as possible, the holes are made hexagonal, and the partitions filed almost to an edge. He has also made the breadth of each hexagon $\frac{3}{10}$ of an inch, so that its surface is more than nine times greater than common; upon which account, as well as by reason of the greater number of holes, the valve may be raised with a sixth part of the force commonly necessary.

Another imperfection is owing to the piston's not fitting exactly, when put close down to the bottom; which leaves a lodgment for air, that is not got out of the barrel, and proves of bad effect; by hindering the rarefaction from being carried on beyond a certain degree: for as the piston rises, the air will expand itself; but still pressing upon the valve, according to its density, it hinders the air within the receiver from coming out. Hence, were this vacancy to equal the 150th part of the capacity of the whole

barrel, no air could ever come out of the receiver when once expanded 150 times, though the piston was constantly drawn to the top. This inconvenience Mr. Smeaton has endeavoured to overcome, by shutting up the top of the barrel with a plate, having in the middle a collar of leathers, through which the cylindrical rod works, that carries the piston. By this means, the external air is prevented from pressing upon the piston; but that the air, which passes through the valve of the piston from below, may be discharged out of the barrel, there is also a valve applied to the plate at the top, that opens upwards. The consequence of this construction is, that when the piston is put down to the bottom of the cylinder, the air in the lodgment under the piston will evacuate itself so much the more, as the valve of the piston opens more easily, when pressed by the rarified air above it, than when pressed by the whole weight of the atmosphere. Hence, as the piston may be made to fit as nearly to the top of the cylinder, as it can to the bottom, the air may be rarified as much above the piston, as it could before have been in the receiver. It follows, therefore, that the air may now be rarified in the receiver, in the duplicate proportion of what it could be upon the common principles; every thing else being supposed perfect.

Mr. Smeaton has also improved upon the gages, commonly used for measuring the expansion of the air; which his gage will do with certainty, to much less than the 1000th part of the whole. It consists of a bulb of glass, something in the shape of a pear, and sufficient to hold about half a pound of quick-silver. It is open at one end, and at the other end is a tube hermetically closed at top. By the help of a nice pair of scales, he found what proportion of weight a column of mercury of a certain length, contained in the tube, bore to that which filled the whole vessel; and, by these means, was enabled to mark divisions upon the tube, answering to the $\frac{1}{1000}$ th part of the whole capacity; which being about $\frac{1}{10}$ th of an inch each, may, by estimation, be easily subdivided into lesser parts. This gage, during the exhausting of the receiver, is suspended therein by a slip-wire; and when the pump is worked as much as shall be thought necessary, the gage is pushed down, till the open end is immersed in a cistern



A Section &c. of M^r Smeaton's
Air-PUMP.

Fig. 3.

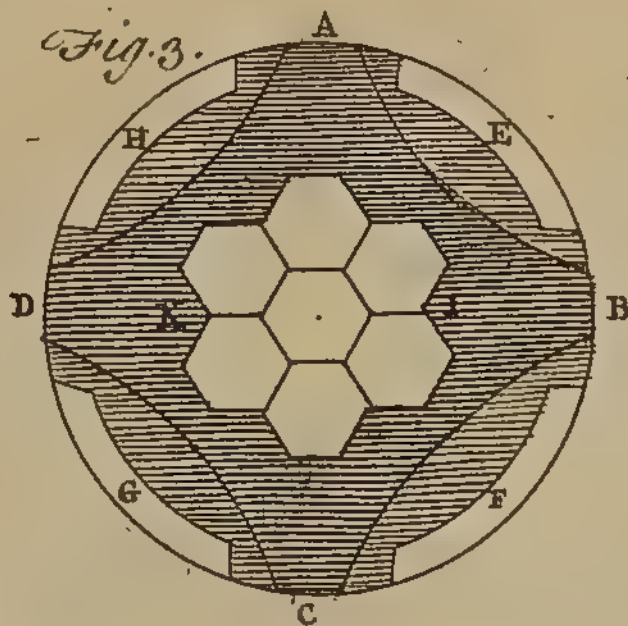


Fig. 2.

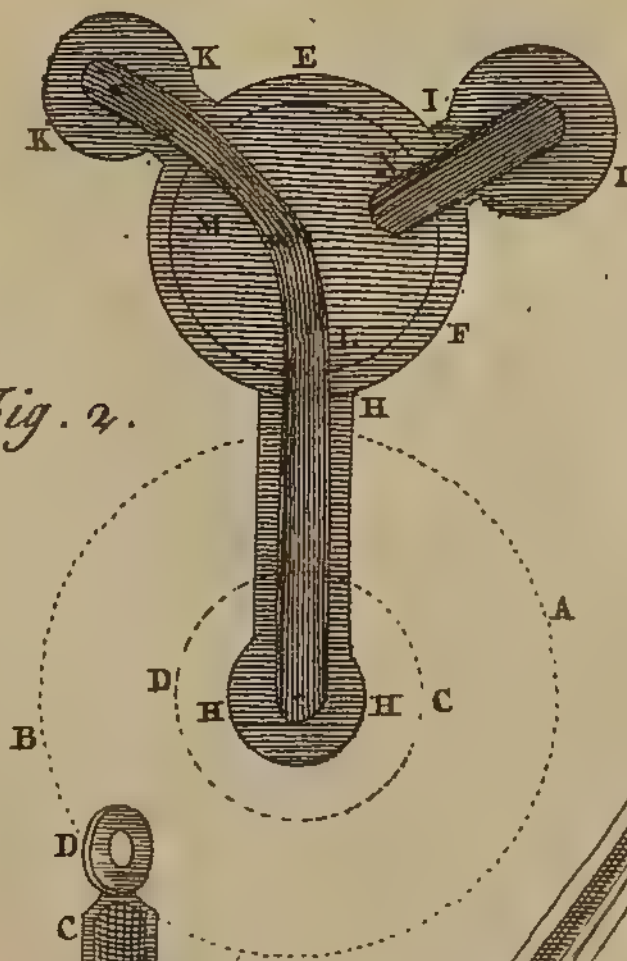


Fig. 4.

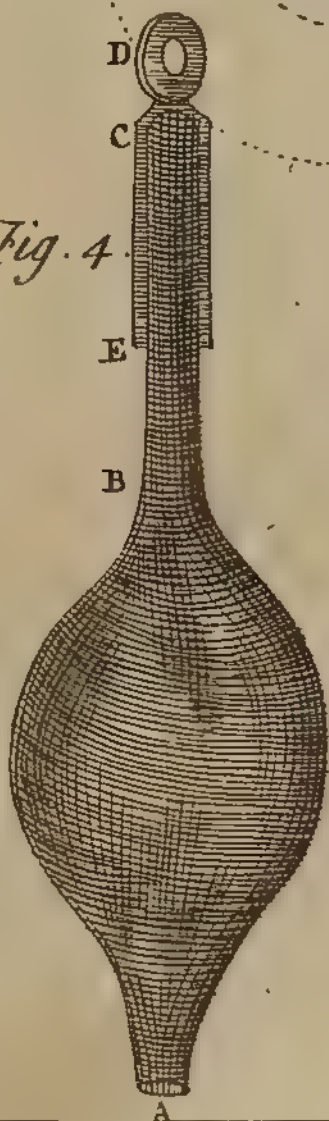
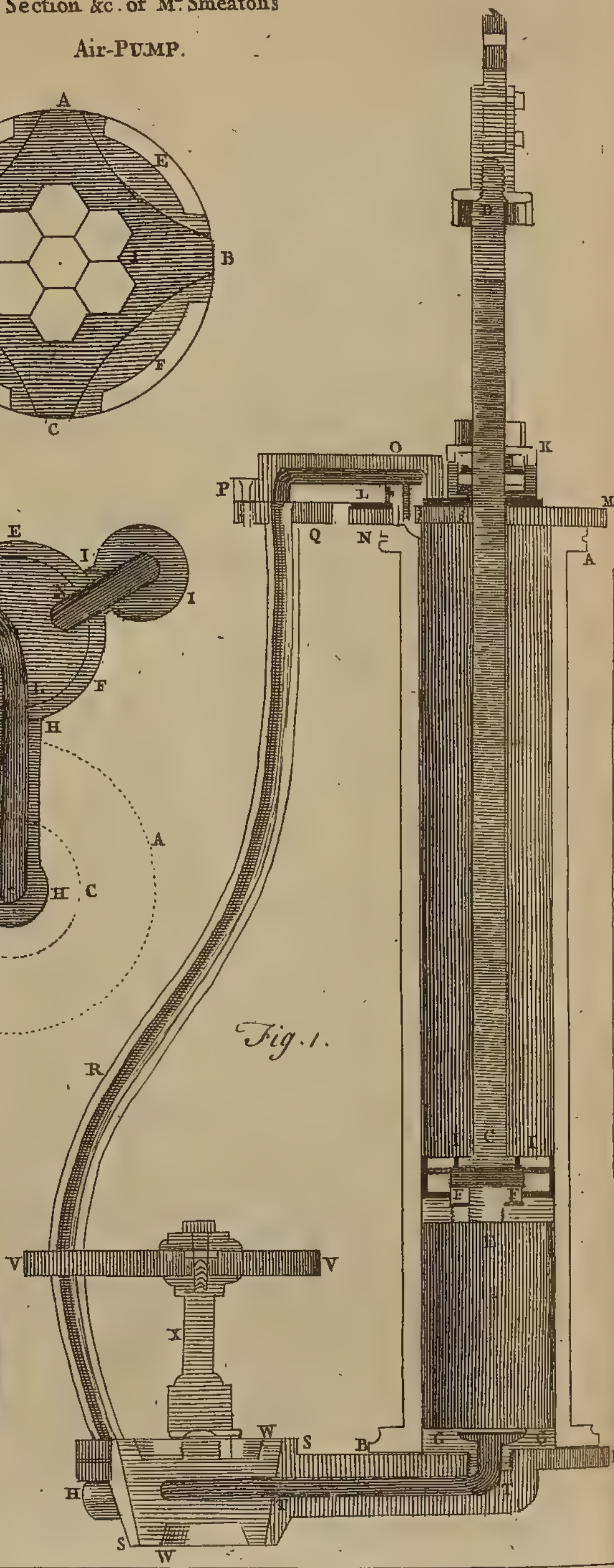


Fig. 1.



J. Jefferys

cistern of quick-silver, placed underneath: the air being then let in, the quick-silver will be driven into the gage, till the air remaining in it becomes of the same density with the external air; and as the air always takes the highest place, the tube being uppermost, the expansion will be determined by the number of divisions occupied by the air at top.

He has also endeavoured to render the pneumatic apparatus more simple and commodious, by making the air-pump act as a condensing engine at pleasure, by only turning a cock: this renders the pump an universal engine for shewing any effect, that arises from an alteration in the density or spring of the air; and with a little addition of apparatus, it shews the experiments of the air-fountain, wind-gun, &c. This is done in the following manner: the air above the piston being forcibly driven out of the barrel at each stroke, and having no where to escape but by the valve at top; if this valve be connected with the receiver, by means of a pipe, and at the same time the valve at the bottom, instead of communicating with the receiver, be made to communicate with the external air, the pump will then perform as a condenser. The mechanism is thus ordered: there is a cock with three pipes placed round it, at equal distances. The key is so pierced, that any two may be made to communicate, while the other is left open to the external air. One of these pipes goes to the valve at the bottom of the barrel; another goes to the valve at the top; and a third goes to the receiver. Thus, when the pipe from the receiver, and that from the bottom of the barrel, are united, the pump exhausts: but turn the cock round, till the pipe from the receiver, and that from the top of the barrel communicate, and it then condenses. The third pipe in one case, discharges the air taken from the receiver into the barrel; and, in the other, lets it into the barrel, that it may be forced into the receiver.

But the following figures will serve to render the structure and use of this excellent machine still more plain. Plate CCXIX. fig. 2. is a perspective view of the several parts of the pump together. A is the barrel; B the cistern, in which are included the cock, with several joints: these are covered with water, to keep them air-tight. A little cock to let the

water out of the cistern, is marked *b*. C c c is the triangular handle of the key of the cock; which, by the marks on its arms, shews how it must be turned, that the pump may produce the effect desired. D H is the pipe of communication between the cock and the receiver; E is the pipe, that communicates between the cock and the valve, on the upper plate of the barrel. F is the upper plate of the pump, which contains the collar of leathers *d*; and V, the valve, which is covered by the piece *f*. G I is the siphon gage, which screws on and off, and is adapted to common purposes. It consists of a glass-tube hermetically sealed at *c*, and furnished with quick-silver in each leg; which, before the pump begins to work, lies level in the line *a b*; the space *b c* being filled with air of the common density. When the pump exhausts, the air in *b c* expands, and the quick-silver in the opposite leg rises, till it become a counter-balance to it. Its rise is shewn upon the scale I e, by which the expansion of the air in the receiver may be nearly judged of. When the pump condenses, the quick-silver rises in the other leg, and the degree may be nearly judged of by the contraction of the air in *b c*; marks being placed at $\frac{1}{2}$ and $\frac{2}{3}$ of the length of *b c* from *c*, which shews when the receiver condenses double or treble its common quantity. K L is a screw frame to hold down the receiver, in condensing experiments, which takes off at pleasure; and is sufficient to hold down a receiver, the diameter of whose base is 7 inches, when charged with a treble atmosphere: in which case it acts with a force of about 1200 pounds against the screw-frame. M is a screw, that fastens a bolt, which slides up and down in that leg, by means whereof the machine is made to stand fast on uneven ground.

Fig. 1. plate CCXX. represents a perpendicular section of the barrel and cock, &c. of the pump; where A B is the barrel, C D the rod of the piston, which passes through M N, the plate that closes the top of the barrel. K is the collar of leathers, through which the piston-rod passes. When the piston is at the bottom of the cylinder, the upper part of K is covered by the cap at D, to keep out dust, &c. L is the valve on the upper plate, which is covered by the piece O P, which is connected with the pipe Q R, which makes the communication between the

valve and cock. CE is the piston, and EFF the piston-valves. II are two little holes to let the air pass from the piston-valves into the upper part of the barrel. GG is the principal valve at the bottom of the cylinder. HH is a piece of metal, into which the valve GG is screwed, and closes the bottom of the cylinder; out of which is also composed SS the cock, and KTT the duct from the cock to the bottom of the barrel. WW is the key of the cock. X the stem, and VV the handle.

Fig. 2. *ibid.* is an horizontal section of the cock, through the middle of the duct TT. AB represents the bigness of the circular plate, that closes the bottom of the barrel, and CD the bigness of the inside of the barrel. EFG is the body of the cock; the outward shell being pierced with three holes at equal distances, and corresponding to the three ducts HH, II, KK, whereof HH is the duct that goes to the bottom of the barrel; II, the duct that communicates with the top of the barrel; and KK, the duct that passes from the cock to the receiver. LMN is the key, or solid part of the cock, moveable round in the shell EFG. When the canal LM answers to the ducts HH and KK, the pump exhaults, and the air is discharged by the perforation N. But the key LMN being turned till the canal LM answers to the ducts II and KK, the perforation N will then answer to the duct HH, and in this case the pump condenses. Lastly, when N answers to KK, the air is then left in or discharged from the receiver, as the circumstance requires.

Fig. 3. *ibid.* is the plan of the principal valve; where ABCD represents the bladder fastened in four places, and stretched over the seven holes IK, formed into an hexagonal grating, which Mr. Smeaton chooses to call the honey-comb. EFGH, shews where the metal is a little protuberant, to hinder the piston from striking against the bladder.

Fig. 4. *ibid.* represents the new gage, called from its shape the pear-gage, which is open at A. BC is the graduated tube, which is hermetically closed at C, and is suspended by the piece of brass DE; which is hollowed into a cylinder, and clasps the tube.

PUN, or PUNN, a conceit arising from the use of two words that agree in sound, but differ in the sense. Aristotle describes

two or three kinds of puns among the beauties of good writing, and produces instances of them out of some of the greatest authors in the greek tongue. Cicero has sprinkled several of his works with puns; and in his book, where he lays down the rules of oratory, quotes abundance of sayings, which he calls pieces of wit, that upon examination prove perfect puns.

Puns, when they come easily, and are very ingenious, poignant and apposite, are allowed of in conversation, letters, epigrams, madrigals, mottos, devices, &c. but are absolutely banished out of the grave, serious, and sublime, by reason they weaken its force, and diminish its beauty, which consists in something great and elevated.

PUNA ISLE, an island of South-America, situated in the pacific Ocean, at the entrance of the bay of Guiaquil, in west long. 80°, south. lat. 3° 15'.

PUNCH, an instrument of iron or steel, used in several arts, for the piercing or stamping holes in plates of metals, &c. being so contrived as not only to perforate, but to cut out and take away the piece. The punch is a principal instrument of the metal-button-makers, wafer-makers, patch-makers, shoe-makers, &c. See BUTTON-making, &c.

PUNCH-HORSE, in the manege, is a well set, well knit, horse, short backed and thick shouldered, with a broad neck, and well lined with flesh.

PUNCH is also a name for a sort of compound drink, much used here, and in many parts abroad, particularly in Jamaica, and several other parts of the West-Indies.

Its basis is spring-water, which being rendered cooler, brisker, and more acid, with lemon-juice, and sweetened again to the palate with fine sugar, makes what they call sherbet; to which a proper quantity of spirituous liquor, as brandy, rum, or arrack, being added, the liquor commences punch: the proportion of the ingredients are various; some, instead of lemon-juice, use lime-juice, which makes what they call punch-royal; this is found less liable to affect the head, and is more grateful to the stomach; some also make milk-punch, by adding as much milk to the sherbet as there is water: others use green tea instead of water: and what is called chambermaid's punch is made without any water, of lime-juice, twice as much white.

white wine as lime-juice, and four times as much brandy with sugar.

Several authors condemn the use of punch as prejudicial to the brain and nervous system.

PUNCHEON, PUNCHIN, or PUNCHION, a little block or piece of steel, on one end whereof is some figure, letter, or mark, engraven either in creux or relievé, impressions whereof are taken on metal, or some other matter, by striking it with a hammer on the end not engraven. There are various kinds of these puncheons used in the mechanical arts; such for instance are those of the goldsmiths, cutlers, pewterers, &c.

The puncheon, in coining, is a piece of iron steeled, whereon the engraver has cut in relievé the several figures, arms, effigy, inscription, &c. that are to be in the matrices, wherewith the species are to be marked. Minters distinguish three kinds of puncheons, according to the three kinds of matrices to be made; that of the effigy, that of the cross or arms, and that of the legend, or inscription. The first includes the whole portrait in relievé: the second are small, each only containing a piece of the cross or arms; for instance, a fleur-de-lys, an harp, a coronet, &c. by the assemblage of all which the intire matrice is formed. The puncheons of the legend only contain each one letter, and serve equally for the legend on the effigy side and the cross side. See the article **COINING**.

For the manner of engraving, tempering, and stamping these puncheons, to form the matrices, see the articles **ENGRAVING, MATRICE, &c.**

For the puncheons used in stamping the matrices wherein the types of printing characters are cast, see *Letter FOUNDRY*.

PUNCHEON is also used for several iron-tools of various sizes and figures, used by the engravers in creux on metals. Seal-gravers particularly use a great number for the several pieces of arms, &c. to be engraven, and many stamp the whole seal from a single puncheon.

PUNCHEON is also a common name for all those iron-instruments used by stone-cutters, sculptors, blacksmiths, &c. for the cutting, incising, or piercing their several matters.

Those of sculptors and statuaries serve for the repairing of statues when taken out of the moulds; the locksmiths use the greatest variety of puncheons; some for piercing hot, others for piercing

cold; some flat, some square, some round, others oval, each to pierce holes of its respective figure in the several parts of locks.

PUNCHEON, in carpentry, is a piece of timber placed upright between two posts, whose bearing is too great, serving, together with them, to sustain some large weights.

This term is also used for a piece of timber raised upright, under the ridge of a building, wherein the little forces, &c. are jointed.

PUNCHEON is also used for the arbor, or principal part of a machine, whereon it turns vertically, as that of a crane, &c.

PUNCHEON is also a measure for liquids, containing an hoghead and one third, or eighty-four gallons.

PUNCTA LACRYMALIA. See the article **LACRYMAL**.

PUNCTATED HYPERBOLA, an hyperbola whose oval conjugate is infinitely small, *i. e.* a point. See **HYPERBOLA**.

PUNCTION, in surgery, the same with puncture. See **PUNCTURE**.

PUNCTUATION, in grammar, the art of pointing or of dividing a discourse into periods, by points, expressing the pauses to be made in the reading thereof. See the article **POINT**.

PUNCTUM, in geometry, &c. See the article **POINT**.

The punctum formatum, or generatum, in conics, is a point determined by the intersection of a right line drawn through the vertex of a cone to a point in the plane of the base that constitutes the conic section. See the articles **CONE** and **CONIC SECTIONS**.

The punctum ex comparatione denotes either of the foci of an ellipsis and hyperbola, thus called by Apollonius, because the rectangles under the segment of the transverse diameter in the ellipsis, and under that and the distance between the vertex and the focus in the hyperbola, are equal to one fourth part of what he calls the figure thereof. See **FOCUS, ELLIPSIS, and HYPERBOLA**.

The punctum lineans, is a term used by some authors for that point of the generating circle of a cycloid, or epicycloidal line. See the article **CYCLOID**.

PUNCTUM SALIENS, in anatomy, the first rudiments of the heart in the formation of the foetus, where a throbbing motion is perceived. This is said to be easily observed with a microscope in a brood egg, wherein, after conception,

we see a little speck or cloud, in the middle whereof is a spot that appears to beat or leap a considerable time before the foetus is formed for hatching. See the article FOETUS.

PUNCTURE, in surgery, any wound made by a sharp pointed instrument.

The puncture upon the external parts, and not penetrating deep, is reckoned the most simple wound. In this, after the blood has been stopped at the first dressing, by the application of dry lint, the common digestive, or balsamum Arcæi is to be spread upon a pledgit, and applied once every day; or if the discharge is but small, every other day, covering the dressing with a plaster and compress, and securing the whole with a proper bandage: the first dressings that are applied, especially where there has been a flux of blood, should by no means be removed forcibly, but be left till they fall off of themselves, which they will do when the suppuration is formed. But when a puncture penetrates very deep, the cure is attended with many difficulties, especially if it is made perpendicularly down, and has no depending orifice; for in this case the blood and matter are easily collected at the bottom, and protract the cure, and frequently form fistulæ. To prevent these consequences it will be proper to press the wound from the bottom upwards, and to apply a compress towards the fundus of the wound externally, and what is called the expelling bandage over all, as it presses much lighter upon the lower than the upper parts: but if all this precaution should prove of no effect, it will be adviseable to make a large opening at the bottom of the wound, before any fistulæ are formed, by a probe, in which case great care must be taken that the orifices are not healed before the bottom of the wound; this is to be effected by a short, soft tent, which, when the wound is healed at the bottom, may be removed, and the orifices healed. How wounds of this kind are to be treated, which penetrate into the cavity of the thorax, or abdomen, may be seen under ABDOMEN, THORAX, GASTRORAPHY, &c.

PUNICA, the POMEGRANATE-TREE, in botany, a genus of the icolandria-monogynia class of plants, the corolla whereof consists of five roundish, erect, patent petals, inserted into the calyx: the fruit is a large globose apple, coronated with the calyx, and formed into nine cells;

the seeds are numerous and succulent; the receptacle is membranaceous, and divides every cell of the fruit into two parts. The flowers of the pomegranate, and the bark of the fruit, are strongly astringent.

PUNISHMENT, in law, the penalty which a person incurs on the breach or transgression of any law.

The forms and manners of punishment are various in different ages and countries, and for various crimes, as treason, felony, adultery, parricide, &c. Among us the principal civil punishments are fines, imprisonments, the stocks, pillory, burning in the hand, whipping, ducking-stool, hanging, beheading, quartering, burning, transportation, &c. The ecclesiastical punishments are censures, suspensions, deprivations, degradations, excommunications, anathemas, penances, &c. The military punishments are being shot, running the gantelope, riding the wooden horse, &c.

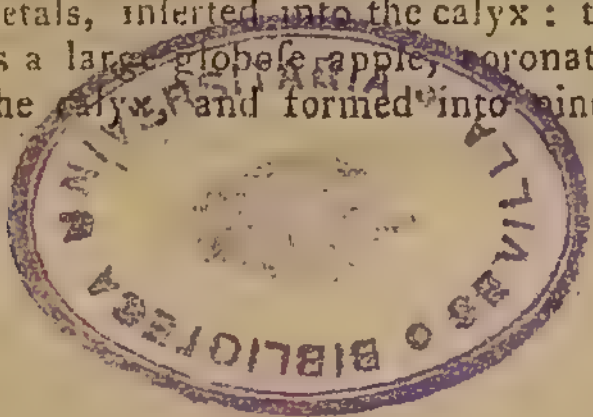
PUNITORY INTEREST, in the civil law, such interest of money as is due for the delay of payment, breach of promise, &c.

PUPIL, *pupillus*, in the civil law, a boy or girl not yet arrived at the age of puberty, *i. e.* the boy under fourteen years, the girl under twelve. While a minor remained under the direction of a tutor, he was called a pupil; after puberty, a curator being assigned him, he ceased to be called a pupil. A tutor is obliged to pay interest for what monies of his pupil lie idle and unemployed; and is allowed to do any thing for his pupil, but nothing against him. See the article TUTOR.

PUPIL is also used in universities, &c. for a youth under the education or discipline of any person.

PUPIL, *pupilla*, in anatomy, a little aperture in the middle of the uvea and iris of the eye, through which the rays of light pass to the crystalline, in order to be painted on the retina, and cause vision. See the articles EYE, IRIS, and UVEA.

The structure of the uvea and iris, is such as that by their aperture the pupil is contractible and dilatible at pleasure, so as to accommodate itself to objects, and to admit more or fewer rays, as the object, being either more vivid and near, or more obscure and remote, requires more or less light: it being a constant law, that the more luminous the object is, the smaller the pupil; and again, the nearer the object, the smaller the pupil; and *vice versa*. This alteration of the pupil



pupil is effected by certain muscular fibres on the outside of the uvea, which arrive from the nerves detached hither from the sclerotica: some others attribute the motion of the pupil to the ligamentum ciliare; and others think that both this and the fibres of the uvea concur herein.

There is a disease of the eyes called a contraction of the pupil, wherein there is such a total or close contraction of that part, that it will not transmit light enough to the bottom of the eye, to enable the patient to see objects distinct; sometimes this disorder is from infancy, and sometimes it arises from an intense inflammation of the eye. The cure of this is extremely difficult; but Mr. Cheselden has invented a method by which he has often proved very successful in his attempts to relieve it. The method is this: the eye-lids being held open by a speculum oculi, he takes a narrow, single edged scalpel, or needle, almost like that used in couching for the cataract, and passing it through the sclerotica, as in couching, he afterwards thrusts it forward through the uvea, or iris, and in extracting cuts it open through the iris. See the article COUCHING.

PURA ELEMOSYNA, PURE ALMS, denotes a tenure whereby the churchmen hold lands in Scotland, somewhat on the footing of the primitive clergy.

PURBECK ISLE, the south-east division of the county of Dorset.

PURCHASE, in law, the buying or acquiring of lands, &c. with money, by deed or agreement, and not by descent or right of inheritance.

A joint purchase is when two or more persons join together in the purchase. Purchasers of lands are to take notice of all charges thereon: there are, however, certain statutes to guard against fraudulent incumbrances. The court of Chancery will relieve the purchaser of a term against a title that lay dormant where money has been laid out on improvements.

PURCHASE, in the sea language, is the same as draw in: thus when they say the capstan purchases a pace, they only mean it draws in the cable a pace.

PURE, something free from any admixture of foreign or heterogeneous matters: thus we say pure fire, &c. See the article FIRE, &c.

PURE HYPERBOLA, in conics, is an hy-

perbola without any oval, nodes, spike, or conjugate point. See CURVE.

PURFLEW, a term in heraldry, expressing ermins, peans, or any of the furs, when they compose a bordure round a coat of arms: thus they say, he beareth gules a bordure, purflew, vairy: meaning that the bordure is vairy.

PURGATION, the art of purging, scouring, or purifying a thing, by separating, or carrying off any impurities found therein: thus,

In pharmacy, purgation is the cleansing of a medicine by retrenching its superfluities. In chemistry, it is used for the several preparations of metals and minerals intended to clear them of their impurities, more usually called purification and refining. See REFINING.

In medicine, purgation is an excretory motion arising from a quick and orderly contraction of the fleshy fibres of the stomach and intestines, whereby the chyle, corrupted humours, and excrements lodged therein, are protruded further and further, and at length quite excluded the body by stool. See the articles CATHARTICS and EVACUATION.

For the menstrual purgations of women, see the article MENSES.

PURGATION, in law, signifies the clearing a person's self of a crime of which he is suspected and accused before a judge. This purgation is either canonical or vulgar. Canonical purgation is prescribed by the canon-law, and the form thereof in the spiritual court is usually thus: the person suspected takes his oath that he is innocent of the crime charged against him; and at the same time brings some of his neighbours to make oath that they believe he swears truly. Vulgar purgation was antiently by fire or water, or else by combat, and was practised here till abolished by our canons. See the article COMBAT, &c.

PURGATIVE, or PURGING MEDICINES, a medicament which evacuates the impurities of the body by stool, called also cathartics. See CATHARTICS.

We have had attempts of adjusting the doses of purgative medicines scientifically. Dr. Cockburn endeavoured at the solution of this problem, but it is said, on wrong principles. Dr. Balguy, in the Medical Essays of Edinburgh, has also given us an essay on this subject. He assumes, that part of the medicines is spent on the first passages, where it acts

as a stimulus; and that the other part is carried into the blood, and has its effects there by thinning and rarifying it. This being premised, 1. If the medicine acts only in the first passages, the dose will be as the size of the person into the constitution. 2. If the whole medicine passes into the blood, the dose will be as the size into the square of the constitution; and, therefore, 3. You are to dose so much of the medicine as is spent on the stomach and intestines directly as the constitution, and so much as is carried into the blood as the square of the constitution; and the sum into the person's size is the quantity required. The same rules hold in vomits. How far in either case the practice of physic may be thereby improved, we leave to the judgment of the learned. The solution of the problem supposes a great postulatum, no less than the art of measuring a person's constitution.

PURGATORY, a place in which the just who depart out of this life, are supposed to expiate certain offences which do not merit eternal damnation.

Broughton has endeavoured to prove, that this notion has been held by pagans, jews, and mahometans, as well as by christians.

The doctrine of purgatory is a very lucrative article to the clergy of the romish church, who are very liberally paid for masses and prayers for the souls of the deceased. We are told by some of their doctors, that purgatory is a subterraneous place situated over the hell of the damned, where such souls as have not yet made satisfaction to divine justice for their sins, are purged by fire, after a wonderful and incomprehensive manner; and here they are purified from those dregs which hinder them from entering into their eternal country, as the catechism of the council of Trent expresses it.

PURGE, in medicine, the same with cathartics. See the article **CATHARTICS**.

PURIFICATION, in matters of religion, a ceremony which consists in cleansing any thing from a supposed pollution or defilement.

The pagans, before they sacrificed, usually bathed or washed themselves in water, and they were particularly careful to wash their hands, because with these they were to touch the victims consecrated to the gods. It was also customary to wash the vessel with which they

made their libations. The mahometans use purifications as previous to the duty of prayer; these also are of two kinds, either bathing, or only washing the face, hands and feet. The first is requested only in extraordinary cases, as after having lain with a woman, touched a dead body, &c. But lest so necessary a preparation for their devotion should be omitted, either where water cannot be had, or when it may be of prejudice to a person's health, they are allowed in such cases to make use of fine sand, or dust instead of it; and then they perform this duty by clapping their open hands on the sand, and passing them over the parts, in the same manner as if they were dipped in water.

There were also many legal purifications among the Hebrews. When a woman was brought to bed of a male child, she was esteemed impure for forty days; and when of a female, for sixty; at the end of which time she carried a lamb to the door of the temple, to be offered for a burnt-offering, and a young pigeon or turtle for a sin-offering, and by this ceremony she was cleansed or purified. For other purifications of the Jews, see the article **IMPURITY**.

Among the romanists, the holy water is used by way of purification.

PURIFICATION of the blessed Virgin, a festival of the christian church, observed on the second of February, in memory of the purification of Christ in the temple, and his mother's submitting to the jewish law of purification, after the birth of a male-child.

PURIFICATION, in chymistry, the act of purifying or refining natural bodies, by separating the fæces and impurities from them. For the method of purifying metals, see the article **REFINING**, &c.

For the purification of semi-metals, see the articles **ANTIMONY**, **SULPHUR**, &c.

PURIM, or *the feast of lots*, a solemn festival of the Jews, instituted in memory of the deliverance they received from Haman's wicked attempt to destroy them, by means of Mordecai and Esther.

PURITAN, a name formerly given in derision to the dissenters from the church of England, on account of their professing to follow the pure word of God, in opposition to all traditions and human constitutions. See the articles **INDEPENDENTS**, **PRESBYTERIANS**, &c.

PURLINS, in building, those pieces of timber that lie across the rafters on the inside,

inside, to keep them from sinking in the middle of their length.

By the act of parliament for rebuilding of London, it is provided, that all pur-lins from fifteen feet six inches, to eighteen feet six inches long, be in their square nine inches and eight inches; and all in length from eighteen feet six inches, to twenty-one feet six inches, be in their square twelve inches and nine inches.

PURLUE, or **PURLIEU**, signifies all that ground near any forest, which being made forest by king Henry II. Richard I. and king John, was afterwards by perambulations and grants of Henry III. severed again from the same, and made purlieu; that is to say, pure and free from the laws of the forest.

The owners of grounds within purlieus, may convert pasture into arable, &c. as also inclose them with any kind of inclosures, or erect edifices upon them, and may dispose of the same as if they had never belonged to the forest: hence if the wild beasts chance to wander out of the forest into the purlieu, the king has still a property in them, against every man except the owner of the ground in which they are, who hath a special property in them *ratione soli*; yet so far as he may take them by hunting with his greyhounds or dogs, without any forestalling or forestetting them in their course again towards the forest.

PURLUE-MAN, or **PURLIEU-MAN**, a person who has ground within the purlieu, and is qualified to hunt within the same, though under certain restrictions.

By a statute of Car. II. no man may keep greyhounds within the purlieu, or elsewhere within England and Wales, unless he have a free warrant, or be lord of a manor, or such a freehold as is seised in his own right, or in right of his wife, of lands, tenements, or hereditaments, of the clear yearly value of 40 l. over and above all the charges of reprises of such estate of inheritance; or of lands, tenements, &c. in his own right, or in the right of his wife, for the term of life or lives, of the yearly value of 80 l. over and above all charges and reprises; or that is worth in goods or chattels 400 l. Others that are not thus qualified, and yet have land in the purlieus, if they find beasts of the forest in their own ground, within the purlieu, may chase them out with little dogs, though not with greyhounds.

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PURPLE, a colour composed of a mixture of red and blue.

A beautiful transparent purple for painting, may be made by boiling four ounces of rasped brasil-wood in a pint of stale beer, and half an ounce of logwood, till the liquor is heightened to the colour you desire, which may be known by dipping a piece of paper in it. If you find it too red, add a quarter of an ounce more of logwood, which will render it still deeper, and by this method you may bring it to any degree of purple, by putting in either more or less logwood to the former composition, and fixing it with alum. This will produce such a clear purple, as no mixture of reds and blues will produce. Madam Mariana of Amsterdam, famous for painting in miniature, and for her excellent manner of illuminating prints, says, that the best purple that can be made, may be composed between the carmine and indigo; to strengthen which, on the red side, you may add lake, between the lighter and darker part: and so lake, when it is used in the same way, on the foregoing purple, produces a very fine effect.

To dye stuffs, &c. a PURPLE. Allow a sufficient quantity of fair water to every pound of stuff, one pound of tartar, and two ounces of alum, in which boil the stuff for an hour; then take it out, cool and rinse it; after this, warm some clean water, into which put three ounces of brasil-wood; boil it half an hour, and then work the stuffs in it, till they are as red as desired: upon which take them out, and put into the dye two ounces of pot-ashes; stir it well about; put in the stuff once more; roll it off and on the roller, that it do not spot; then cool, and rinse it out.

To dye stuffs of a lasting purple. For this purpose the stuff, when white, ought to be very clean and free from spots and stains, that it may have the better lustre when dyed. To give it the blue cast, the stuff must be first dyed to the depth of a sky-colour with wood or indigo, and then dried. To give it the deepening, boil half a pound of brasil, and divide it into four parts, and dye it time after time in each with the following mixture: To the first part of the brasil add one dram of saltpetre, and one dram of sal armoniac powder; to the second, add a quarter of an ounce of powdered galls, and half an ounce of Paris-red; to the third, a quarter of an ounce of galls,

and a quarter of an ounce of calcined tartar, and of alum and saltpetre, each a dram. The fourth time, add a quarter of an ounce of galls powdered, as much turmeric, and a quarter of sharp lye, and you will have a beautiful colour.

To dye silk a slight purple, put it into the lighter red-dye; but increase the quantity of pot-ashes, to turn it to purple; then rinse and dry it.

To dye thread of a purple-colour, first alum the thread with three pounds of alum, half a pound of tartar, and two ounces of brasil; dry it, and draw it through the wood or indigo-dye; then rinse it clean, and dry it again: to deepen it, take ten ounces of brasil, being first boiled, which liquor divide into three parts, to be used at three times. To the first add half an ounce of paris-red, one dram of mastich, and a quarter of an ounce of calcined tartar; always drying the thread, after you have used every one of the parts of the liquor. The second time, add half an ounce of turmeric, two drams of cinnabar, and half an ounce of gum-arabic. The third time, when the thread becomes reddish, add a quart of sharp lye; and by this means the thread will obtain a lasting colour.

PURPLE FEVER, the same with miliary fever. See **MILIARY FEVER**.

PURPURA, in natural history, a genus of simple shells, having no hinge, formed of one continuous piece, and covered from the top to the bottom with spines, tubercles, and umbos: the mouth is small, and approaches to a round figure: the clavicle is short, but the other extremity is usually protended to a considerable length.

To this genus belong, 1. The thorny woodcock shell, or yellow purpura, with long and somewhat crooked spines. (See plate CCXXI. fig. 1. n° 1.) 2. The common woodcock-shell, or variegated yellowish purpura, with tubercles, and a very long beak (*ibid.* n° 2.) 3. The endive-shell, or short-beaked purpura, with six series of lacinated spines (*ibid.* n° 3.) 4. The caltrop-shell, or short-beaked purpura, with expanded spines, ranged in three series (*ibid.* n° 4.)

There are a great many other species, distinguished by the like peculiarities.

PURPURE, **POURPRE**, or **PURPLE**, in heraldry, according to some, is one of the five colours of armories, compounded of gules and azure, bordering on violet, and, according to others, of a great deal

of red and a little black. But it was excluded by the antient heralds as only an imperfect colour. In the coats of noblemen it is called amethyst; and in those of princes, mercury. It is represented in engraving, by diagonal lines drawn from the sinister chief to the dexter base point. See plate CCXVIII. fig. 4.

PURPURATI, in our antient historians, denotes the sons of emperors and kings.

PURREL, a list ordained by act of parliament to be made at the end of kerseys, to prevent deceit in diminishing their length.

PURSE, a manner of accounting, or a species of money of account, much used in the Levant. See the article **MONEY**.

PURSER, an officer aboard a man of war, who receives her victuals from the victualler, sees that it be well stowed, and keeps an account of what he every day delivered to the steward. He also keeps a list of the ship's company, and sets down exactly the day of each man's admission, in order to regulate the quantity of provisions to be delivered out, and that the paymaster or treasurer of the navy may issue out the disbursements, and pay off the men, according to his book.

PURSIVENESS, among farriers, is a disorder in horses, otherwise called broken wind, in which the horse makes a hissing whistling sound in his throat, and has a greater heaving in the flanks than in common colds.

The cause of pursiveness proceeds from surfeiting, hard exercise upon a full belly, the horse's being rid into water when he sweats, and, lastly, from obstinate colds ill cured.

For the cure of this disorder, Dr. Bracken advises, that the horse should have good nourishment, much corn but little hay, and that every other day the water given him be impregnated with half an ounce of saltpetre, and two drams of sal armoniac.

PURSLAIN, *portulaca*, in botany, a genus of the polyandria-monogynia class of plants, the corolla whereof consists of five plane, erect, obtuse, emarginated petals, larger than the cup; the fruit is an oval, covered capsule, containing only one cell, and opening horizontally at the middle; the seeds are numerous, small, and roundish.

This plant is cultivated in gardens for culinary uses; the seeds are ranked among the lesser cold seeds, and have sometimes

sometimes been employed in emulsions, and the like, along with others of that class.

PURSUIVANT, or **POURSUIVANT**. See the article **POURSUIVANT**.

PURVEYANCE and **PURVEYOR**. See the article **POURVEYANCE**.

PURVIEW, a term used by some lawyers for the body of an act of parliament, or that part which begins with, *Be it enacted, &c.* as contradistinguished from the preamble.

PURULENT, in medicine, something mixed with, or partaking of, pus or matter.

PUS, in medicine, a white or yellowish putrid matter, formed of corrupted blood, and contained in a wound or ulcer. See **ABSCESS** and **SUPPURATION**.

When pus is laudable and mild, it is one of the most powerful digesters, suppurants, and incarners; when it stagnates too long, or when the liquors and vessels are faulty, it may become an acrid, stimulating, eroding sanies; when absorbed in the blood, it affects all the liquors, stimulates the vessels, and is capable of producing violent disorders: for a very small portion of pus absorbed into the blood-vessels, raises a putrid fever, as certainly as yeast does a fermentation in wort.

PUSTULE, a pimple, or small eruption on the skin full of pus; such are the pustules of the small-pox and french-pox. See the article **POX**.

Pustules principally break out in the spring, and are of various kinds; for sometimes a kind of roughness arises all over the body, resembling that which is produced by the application of a nettle; these are sometimes red, and sometimes they retain the natural colour of the skin. There are also pustules of a livid, a pale, a black, or any other unnatural colour, with an humour contained in them; when they break, the subjacent flesh frequently appears as if it was ulcerated.

Pustules are sometimes converted into small ulcers, either moist or dry; sometimes they are accompanied only with an itching, at other times with inflammation and pain; and a pus or sanies, or both, are discharged.

In the cure of pustules, the first step to be taken is to use much exercise and walking; and if these cannot be practised, gestation is the best succedaneum. The second step is to diminish the quantity of aliments, and abstain from all acrid and extenuating substances.

Ulcers formed from pustules, are removed by litharge mixed with the seeds of fenugreek, adding oil of roses and the juice of endive till they are of the consistence of honey.

PUTANISM, whoredom, or the life or condition of a courtesan.

PUTLOGS, or **PUTLOCKS**, in building, a short piece of timber about seven feet long, used in building scaffolds. They lie at right angles to the wall with one of their ends resting upon it, and the other upon the poles which lie parallel to the side of the wall of the building.

PUTORIUS, the **POLE-CAT**, in zoology, the yellowish black mustela, with a white mouth and yellow collar. See the article **MUSTELA**.

This creature is somewhat smaller than the Martin; the head is small, oblong, pointed at the extremity, and rounded on the summit; the ears are short, broad, patulous, and white at the edges; the eyes are large, black, and piercing in their aspect; the mouth is wide, and well furnished with teeth; the neck is short and thick; the body is long and slender; and the legs are short, and not very robust.

PUTREFACTION, a kind of slow corruption produced by heat and some moist fluid, particularly the air and water; which, penetrating the pores, dissolves and sets at liberty some of the more subtle parts, particularly the salts and oils, and thus loosens the compages, and changes the texture of bodies. See the article **CORRUPTION**.

Putrefaction is one of the instruments of nature by which many great changes are brought about. If we take a quantity of fresh and green cabbage-leaves, says Dr. Shaw, and press them hard down with weights in an open tub bored full of holes on the sides, and set in a warm place; by standing in this state for some days, the leaves conceive a heat in the middle, which spreads to the external parts, till at length nearly the whole is converted into a pappy substance resembling putrified flesh, which on being distilled in a glass-retort, affords the same kind of volatile salt and oil, as if it had been an animal substance. This experiment succeeds alike in all tender, juicy, vegetable subjects; so that both the acid and alkaline tribe of plants, the sweet and the bitter, the astringent and emollient, &c. resolve into the same pappy putrid substance.

Hence we see the way employed by nature for changing all vegetable into animal substances, or of reducing the matters of both kingdoms into a similarity. Thus if any large animal body, as that of a horse, or dog, for example, be exposed in a dead state to the open air and the summer's sun, it in a few days begins to swell, purge, and emit a nauseous stench: at length the carcase is destroyed by the commotion, and resolved into a putrid, fetid, stercoraceous matter: a large part, in the mean time, flying off into the air, so as to leave but a small proportion of a mucilaginous pappy substance, which soon grows dry, or turns to a kind of earth. This experiment is universal, and holds equally of birds, beasts, and fishes. Whence rivers, the ocean, and the atmosphere itself must be necessarily impregnated with fermenting, putrefying, and putrefied particles; which are mixed with other matters and dispersed through the immense bodies of those fluids, in which they undergo such changes, whether by uniting with the salts of the air and ocean, or otherwise, as not ordinarily to prove destructive or noxious to the creatures that inhabit those elements. But by the very means by which bodies are dissolved, and reduced to their first principles, they are still kept in being. With regard to medicine, we know that neither animal nor vegetable substances can become aliment without undergoing some degree of putrefaction. Many distempers proceed from a deficiency of this action. The crisis of fevers seems to depend upon it, and even animal heat, according to Dr. Stevenson, does the same.

Now that the concoction of the humours is nothing else but putrefaction, says Dr. Pringle, in his Observations on the diseases of the army, seems probable from hence, that whenever they are in that state, they are always more fluid, and fitter to pass through the smaller vessels, where they stagnated before. The offensiveness of the sweats, or other excretions consequent on a crisis, is also a sure sign of a high degree of corruption. The time of resolution or putrefaction depends on the degree of heat, the habit of the patient, and on the part obstructed. Resolution is the putrefaction of the empacked humour only, but suppuration implies a corruption of the vessels also. This manner of speaking, indeed, has been disused, from the preju-

dices that nothing was putrid but what was offensively so; whereas, in fact, every fibre becoming more tender, and humour thinner, may be considered as in some degree putrid, whether the change tends to the better health, or the destruction of the person, or whether it becomes grateful or offensive to the senses.

As all the humours of animal bodies become thinner by putrefaction, so the solid or fibrous parts are thereby relaxed and rendered more tender; and hence the extraordinary bulk of the heart, liver, and spleen, incident to persons labouring under putrid diseases, may be accounted for. It is remarkable, that in dissections of people who die of the plague, the heart is almost always found of an uncommon bigness; and as to the scurvy, the liver and spleen are sometimes enlarged to such a degree, as to be seen outwardly.

Putrefaction is always found to generate air. Hence though flesh as well as blood be specifically heavier than water, yet dead bodies are found to float, after lying some time at the bottom, from air generated in the bowels by putrefaction.

The differences between putrefaction and fermentation, according to Boerhaave, are these: 1. A greater grossness, compression and density seems required in putrefaction, then in the fermentation of vegetables. 2. Putrefaction acts upon all vegetables whatsoever, provided they be soft and juicy; but fermentation only upon some, and not upon others. 3. The heat required in putrefaction, spontaneously rises from the degree of an healthy human body, even to that of a violent flame; but in fermentation, if the degree of heat rises up to that of an healthy body, the fermenting cause is dissipated, and the liquor turned vapid; for the heat generated by fermentation is not greater than that of seventy-five degrees, except in the fermentation of vinegar, and even there, unless the heat be immediately stopped, no vinegar, but a corrupt vapid liquor will be obtained. 4. Putrefaction renders all the saline matters volatile and alkaline, the oils fetid and volatile, and almost volatilizes the earth itself; but fermentation makes acids volatile and subtiler, and contrary to alkalies, spirituous, gratefully odorous and inflammable; and it generates an acid tartar, that leaves an alkaline matter as fixed in the fire, as the subject would have done before. 5. The salts that

that by putrefaction are of the same simple, alkaline, fetid volatile nature, are by fermentation acid, in a great measure fixed, and compounded of spirit, oil and earth. And, 6. Putrefaction is a means of intirely converting all the saline vegetable matters into one and the same simple volatile alkali; but fermentation converts only a small part of the saline matter of vegetables, into a liquid, volatile acid, leaving the rest almost unchanged.

PUTRID, something rotten, or putrified. See the article **PUTREFACTION**.

Thus a putrid fever, is a fever in which the humours, or part of them, are become putrefied, as in malignant fevers. See the article **MALIGNANT**.

PUTTOCKS, or **PUTTOCK** *shrouds*, in a ship, are small shrouds which go from the shrouds of the main-mast, fore-mast, and mizen-mast, to the top-mast shrouds; and if there be any top-gallant masts, there are puttocks to go from the top-mast shrouds into these. These puttocks are at the bottom seized to a staff, or to some rope which is seized to a plate of iron, or to a dead man's eyes, to which the lanniards of the fore-mast shrouds do come.

PUTTY, the same with *spodium*. See the article **SPODIUM**.

PUTTY, in its popular sense, is a kind of paste compounded of whiting and linseed oil, beaten together to the consistence of thick dough.

It is used by glaziers for the fastening in the squares of glass in sash-windows, and by painters for stopping up the crevices and clefts in timber and wainscots, &c.

PUTTY, sometimes also denotes the powder of calcined tin, used in polishing and giving the last gloss to works of iron and steel.

PUTURA, a custom claimed by the keepers of forests, and sometimes by bailiffs of hundreds, to take man's meat, horse's meat, and dog's meat, of the tenants and inhabitants gratis, within the perambulation of the forest, or liberty of the hundred.

The land subject to this custom is called *terra putura*.

PYANEPSIA, in antiquity, an athenian festival celebrated on the seventh day of the month *pyanepsion*; which, according to the generality of critics, was the same as our september.

Plutarch refers the institution of this feast to Theseus, who after the funeral of his father, on this day paid his vows to A-

pollo, because the youths who returned with him safe from Ciete then made their entry into the city. On this occasion these young men putting all that was left of their provisions into one kettle, feasted together on it, and made great rejoicing. Hence was derived the custom of boiling pulse on this festival. The Athenians likewise carried about an olive branch, bound about with wool, and crowned with all sorts of first fruits, to signify that scarcity and barrenness were ceased, singing in procession a song. And when the solemnity was over, it was usual to erect the olive-branch before their doors, as a preservative against scarcity and want.

PYCNOSTYLE, in the antient architecture, is a building where the columns stand very close to each other; only one diameter and a half of the column being allowed for the intercolumniations.

According to Mr. Evelyn, the *pycnostyle* chiefly belonged to the composite order, and was used in the most magnificent buildings; as at present in the *peristyle* at St. Peter's at Rome, which consists of near three-hundred columns; and in such as yet remain of the antients, among the late discovered ruins of *Palmyra*.

PYCNOTICS, the same with *incrassants*. See the article **INCRASSATING**.

PYE, or *SEA-PYE*, *hæmatopus*. See the article **HÆMATOPUS**.

PYGARGUS, in ornithology, the falco with a yellow cere, and with the tail-feathers white and black at the end. See the article **FALCO**.

PYGME, the same with cubit. See the article **CUBIT**.

PYGMY, a person not exceeding a cubit in height.

This appellation is given by the antients to a fabulous nation said to have inhabited Thrace; who brought forth young at five years of age, and were old at eight; these were famous for the bloody war they waged with the cranes.

PYLORUS, in anatomy, the right or lower orifice of the stomach, which is connected with and opens into the intestines. See the articles **STOMACH** and **INTESTINES**.

PYONY, or *PIONY*. See **PIONY**.

PYRAMID, *πυραμς*, in geometry, a solid standing on a triangular, square, or polygonal basis, and terminating in a point at the top; or, according to Euclid, it is a solid figure, consisting of several

veral triangles, whose bases are all in the same plane and have one common vertex. See plate CCXXI. fig. 2. n° 1, 2, 3.

Hence the superficies of a given pyramid is easily found by measuring these triangles separately; for their sum added to the area of the base, is the surface of the pyramid required.

It is no less easy to find the solid content of a given pyramid; for the area of the base being found, let it be multiplied by the third part of the height of the pyramid, or the third part of the base by the height, and the product will give the solid content, as is demonstrated by Euclid, lib. 12. prop. 7.

If the solid content of a frustum of a pyramid is required, first let the solid content of the whole pyramid be found; from which subtract the solid content of the part that is wanting, and the solid content of the frustum, or broken pyramid, will remain. See FRUSTUM.

Every pyramid is equal to one third of its circumscribing prism, or that has the same base and height; that is, the solid content of the prism ABD (*ibid.* n° 2.) is equal to one third of the prism $ABFE$. For supposing the base $AaBb$ a square, then does the pyramid consist of an infinite number of such squares, whose sides or roots are continually increasing in arithmetical progression, beginning at the vertex or point D ; its base, $AaBb$, being the greatest term, and its perpendicular height, CD , the number of all the terms: but the last term multiplied into the number of terms will be triple the sum of all the series, or
$$\frac{NLL}{3} = S$$

= the solid content of the pyramid.

All pyramids are in a ratio compounded of their bases and altitudes; so that, if their bases be equal, they are in proportion to their altitudes; and vice versa.

Equal pyramids reciprocate their bases and altitudes; that is, the altitude of one is to that of the other, as the base of the one is to that of the other.

PYRAMID, in architecture, a solid massive building, which from a square, triangular, or other base, rises diminishing to a vertex or point.

Pyramids are sometimes used to preserve the memory of singular events; and sometimes to transmit to posterity the glory and magnificence of princes. But as they are esteemed a symbol of immortality, they are most commonly used as funeral monuments, such is that of Ce-

stus at Rome, and those other celebrated ones of Egypt, as famous for the enormity of their size, as their antiquity. These are situated on the west side of the Nile almost opposite to Grand Cairo; the base of the largest covers more than ten acres of ground, and is, according to some, near seven hundred feet high, tho' others make it but six hundred, and some but little more than five hundred. The pyramid is said to have been, among the Egyptians, a symbol of human life; the beginning of which is represented by the base, and the end, by the apex; on which account it was, that they used to erect them over sepulchres.

PYRAMIDAL, something relating to a pyramid. See the preceding article.

PYRAMIDAL NUMBERS. See NUMBER.

PYRAMIDALES papillæ. See the article PAPILLA.

PYRAMIDALIA CORPORA, in anatomy, the two protuberances of the medulla oblongata. The spermatic vessels are also by some authors thus termed.

PYRAMIDALIS, in anatomy, a small muscle in the abdomen lying in the lower part of the rectus. It has its name from its figure, and its origin from the margin of the os pubis, with a broad fleshy head, whence it grows gradually narrower, till it ends in a small round tendon in the linea alba, sometimes almost at the navel. This muscle is sometimes single, sometimes it has its fellow, and in some subjects they are both wanting.

Pyramidalis is also the name of one of the dilatores, or muscles which serve to turn up the nose. This muscle rises at the foot of the nose, and is usually continuous with the frontalis. It descends along the side of the nose, where it is by degrees a little expanded. It is inserted into the alæ of the nose, and often sends down its fibres as far as to the upper-lip.

PYRAMIDOID, the same with the parabolic spindle. See the article PARABOLIC.

PYRATE. See the article PIRATE.

PYRENEAN MOUNTAINS divide France from Spain, and are not inferior to the Alps in height: they extend from the Mediterranean to the ocean, upwards of two hundred miles in length; the greatest breadth being about one hundred and twenty.

PYRENOIDES PROCESSUS, in anatomy, a process of the second vertebra of the neck, called also odontoides, and denticiformis.

PYRETHRUM, in the materia medica,

Fig. 1. PURPURA.

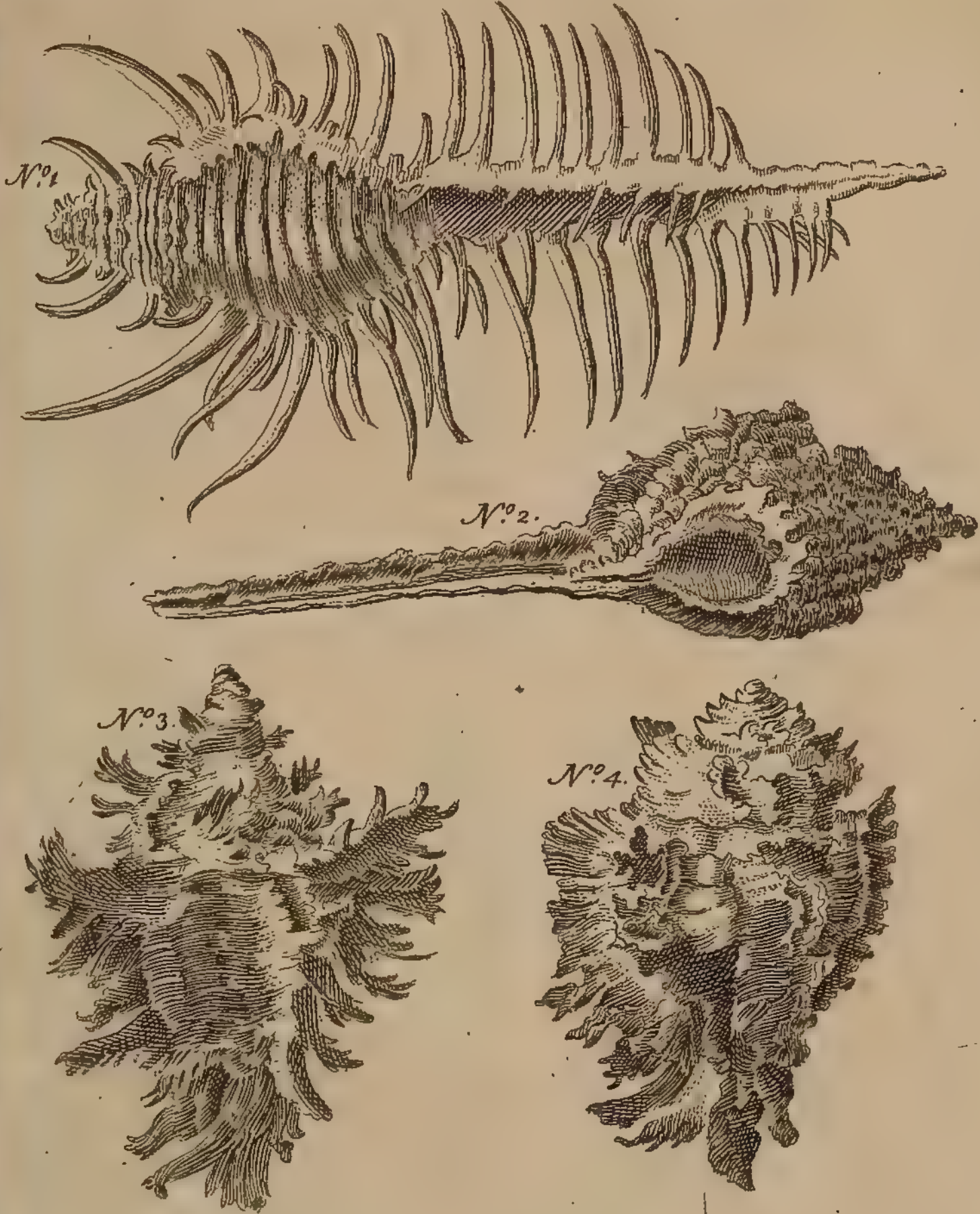
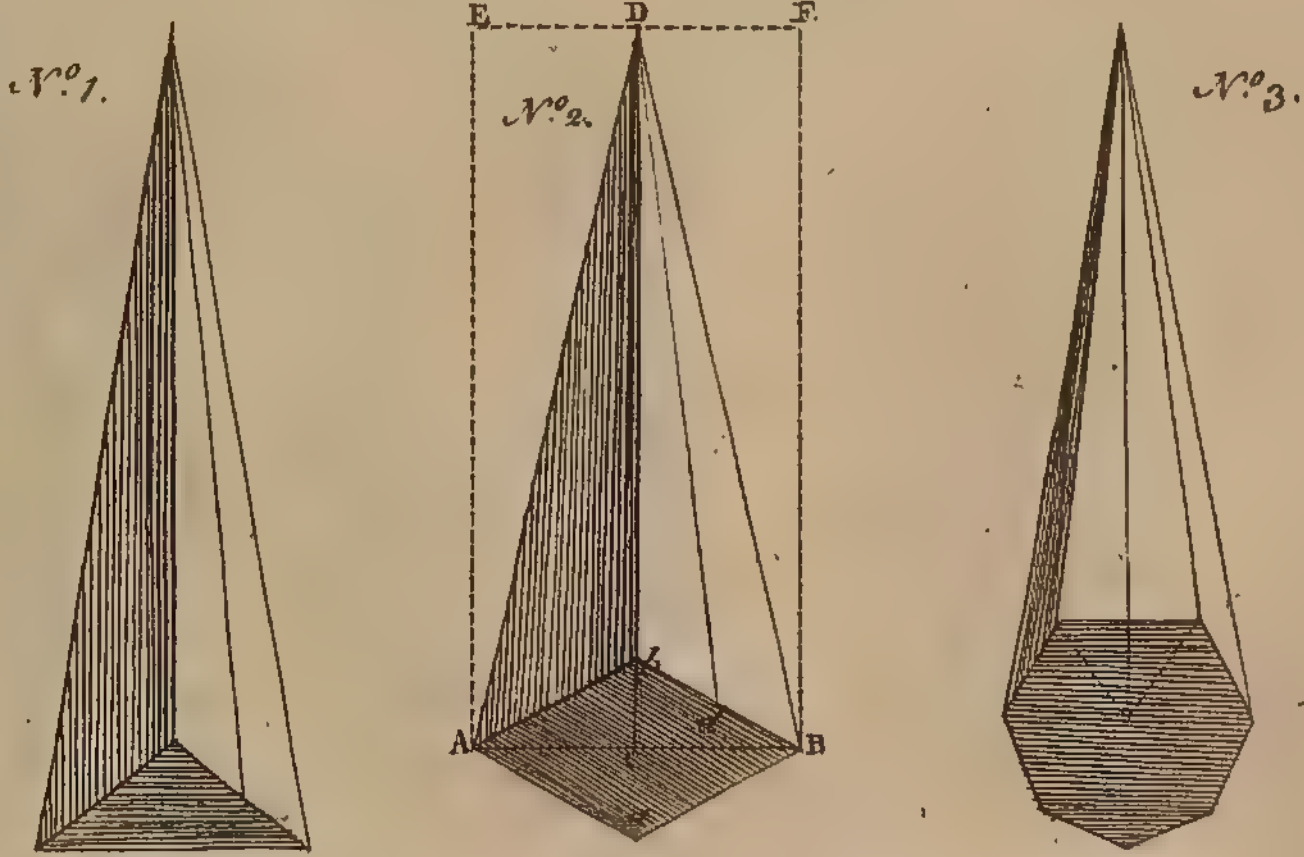


Fig. 2. PYRAMID.



J. Joffroy sculp

the root of a species of the bupthalmum, called, among us, pellitory of Spain. See the article BUPHTHALMUM.

The pyrethrum is a small and firm root, about two or three inches in length, and from a quarter of an inch to a little more in diameter; its surface is very much corrugated; it is of a dusky brown colour on the outside, and appears whitish within. It is to be chosen in the largest and perfectest pieces, sound and firm, and not brittle nor dusty. The eastern nations use a great deal of this root, and send it to Cairo, Constantinople, and other places, where it is esteemed an excellent medicine in colics and diseases of the breast.

There is another kind of pyrethrum which is more uncommon here than the former: this is smaller, slenderer, and of a paler colour, and is the root of a species of the Chrysanthemum. Pyrethrum of either of these kinds is violently acrid and pungent, whence it is of great service in the tooth ach, and other disorders of the head. It vellicates the nerves, and assists in opening their obstructions, and hence is given in sleepy diseases, apoplexies, lethargies, and in palsies of the tongue. It is sometimes added to clysters given in apoplectic and lethargic cases.

PYRETICS, medicines good against fevers. See **FEVER** and **FEBRIFUGE**.

PYRICUBIUM, in natural history, the name of a genus of fossil bodies, usually comprehended, with many others of very different figures and structures, under the general name of pyrites. See **PYRITES**.

PYRIFORMIS, in anatomy, a muscle of the thigh, receiving its name from its figure, which resembles that of a pear. It rises thick from the lower part of the os sacrum, where it is joined to the ileum; from thence it runs transversely towards the joint of the hip, and terminates in a short tendon, which is inserted in the middle of the internal labium of the upper edge of the great trochanter, by two or three branches.

PYRIPLACIS, in natural history, the name of a genus of pyrites, the characters of which are these: they are compound, inflammable, metallic bodies, found in loose detached masses, of a simple and uniform, not striated, internal structure, and are covered with an investient coat or crust. See the article **PYRITES**.

PYRIPOLYGONIUM, in natural history, the name of a genus of fossils, the

characters of which are, that they are compound, metallic bodies, of a regular figure, consisting of twelve planes.

There is only one known species of this genus, tho' subject to great varieties in its appearance; and this has been by authors hitherto confounded, with many other bodies of a very different nature and figure, under the general name pyrites.

PYRITES, or **PYRITÆ**, in natural history, a name used for a class of compound-inflammable metallic bodies found in detached masses, but of no determinately angular figure. This class Doctor Hill divides into two orders, the first of which, being those pyritæ of a plain and simple internal structure, comprehends two genera: the first genus, termed pyriplaces, are those pyritæ of a simple internal structure, and covered with an investient coat or crust; the second genus, termed gymnopyres, are those pyritæ of a simple internal structure, and not covered with a crust; the second order being those pyritæ of a regularly striated internal structure also comprehends two genera, the first termed pyritricha are those pyritæ of a simple striated texture; the second genus called pyritrichiphylla are those pyritæ whose striæ terminate in foliaceous ends.

This fossil is recommended by some authors as an emmenagogue, but it is scarce ever prescribed with this intention; the common green vitriol, or copperas of the shops, is made from it; and an acid somewhat different from that of pure vitriol may be drawn off from it by the retort, after it has been exposed to the air till it moulders away: this is of great use in mineralogy, and is a solvent for several fossils that none of the other acids will touch. See the article **VITRIOL**.

PYRITRICHIPHYLLUM, in natural history, the name of a genus of fossils of the class of the pyrites, the characters of which are these: they are compound, inflammable, metallic bodies, found in loose masses, not of any regularly angular figure, and of a striated texture, with foliaceous ends to the striæ, appearing on the surface or within the mass. See the article **PYRITES**.

PYRITRICHUM, in natural history, the name of a genus of pyrites, the characters of which are these: they are compound, inflammable, metallic fossils, always found in detached masses of no regularly angular figure, and of a simple striated structure. See the article **PYRITES**.

PYR.

PYRMONT, the capital of a county of that name in the circle of Westphalia in Germany, situated on the confines of the duchy of Brunswick, in east long. 9°, north lat. 52°, from whence we receive the best mineral waters in Germany.

The country all about where these springs are, abound with materials which give virtue to the waters, and the quarries of stone wherever they are dug send up spirituous and martial exhalations, as well as the springs that run from them; and the water in general has a vitriolic taste. Hoffman observes, that these waters contain a volatile and subtile principle greatly more penetrating and strong, as well as in larger quantities, than any other mineral water; but that this is not to be expected in them any where but upon the spot, for those who transport them to other places, are constrained to let a part of this fly off to preserve the rest. If either glass or earthen vessels be filled at the spring, and immediately corked or fastened down, the consequence is, that they will burst on the first motion, or heat of the weather. They are therefore forced to fill them only in part first, and let them stand a while for this subtile spirit to exhale; and then a while after filling them up, to cork and fit them for carriage. If they are drank on the spot in a morning upon an empty stomach, they affect the nose with a pungent tingling, and disturb the head for many hours afterwards. If they are taken at the spring; they purge but very little; but if taken in another place after transportation they purge considerably more, and render the stools black. It is observable also, that if they are left in an open vessel a few days, their virtue wholly exhales, and they no longer purge. If tea-leaves, balauftine-flowers, or galls, are put into this water, they first change it to a blue, from that to a purple, and finally into a black; a little spirit of vitriol added to this liquor renders it as limpid as before. If any acid be mixed with this water there is raised an effervescence, and bubbles of air are carried up in great quantity. If any alkaline liquor be added, there is no ebullition raised; but the liquor becomes turbid and milky; and the spirit of vitriol added to this renders it limpid again, &c. It appears upon the whole, that the pyrmont-waters possess a pure extremely penetrating and elastic mineral spirit, and that in a very large proportion; and to this

their virtues are to be principally attributed.

The great quantity of this powerful spirit, contained in the waters, makes them more fit for the robust and strong constitutions, when depraved by illness, than for the weak and tender ones; but even the tenderest people may take them, only by observing to take but a small dose, or to dilute them with an equal quantity of common water immediately before taking them. They are of great efficacy in strengthening the tone of the viscera, opening obstructions, and stimulating in a proper manner the excretory ducts, so as to make them duly perform their office; and Hoffman, on his own experience, recommends them, mixed with equal quantities of milk, as good in scorbutic and gouty cases.

For the imitation of pyrmont-water, or making it artificially, so that it will not only resemble the natural, but will have the same effect as a medicine, see the article *MINERAL Waters*.

PYROCTOGONIUM, in natural history, the name given by Dr. Hill to a genus of fossils comprehended by authors, with many others, under the general name pyrites. See the article *PYRITES*.

PYROLA, *WINTER-GREEN*, in botany, a genus of the decandria-monogynia class of plants, the corolla whereof consists of five roundish, hollow, patent petals; the fruit is a roundish, depressed, pentagonal capsule, containing five cells, and opening at the angles; the seeds are numerous, very small, and paleaceous. See plate CCXXV. fig. 4.

In medicine, this plant has the credit of being esteemed for its refrigerating, desiccative, astringent, and consolidating virtues; and it is very noted as a vulnerary, whether used internally or externally.

PYROMANCY, *πυρομαντεία*, a kind of divination by means of fire. The ancients imagined they could foretell future events, by inspecting fire and flame; and to this end, they considered its direction, which way it turned: sometimes they added other matters to the fire, such as a vessel full of urine, having its neck bound about with wool, watching narrowly on which side it burst, and thence taking their augury: sometimes they threw pitch on it; and, if it took fire immediately, they esteemed it a good augury.

PYROTECHNY, *πυροτεχνία*, the art of fire, or a science which teaches the management

management and application of fire, in several operations. Pyrotechny is of two kinds, military and chemical: military pyrotechny is the doctrine of artificial fire-works and fire arms, teaching the structure and use of those used in war, the attacking of fortifications, &c. as gun-powder, cannons, bombs, grenades, carcasses, mines, fuses, &c. and those made for amusement's sake, as rockets, stars, serpents, &c. See the article GUN-POWDER, CANNON, &c.

Chemical pyrotechny is the art of managing and applying fire in distillations, calcinations, and other operations of chemistry. See FIRE, DISTILLATION, &c.

PYROTICS, πυρολικά, in medicine, caustics, or remedies, either actually or potentially hot; and which accordingly will burn the flesh, and raise an eschar. See the article CAUSTICS.

PYRRHICHA, πυρρική, in antiquity, a kind of exercise on horseback, or a feigned combat, for the exercise of the cavalry.

PYRRHICHIUS, in the greek and latin poetry, a foot consisting of two syllables, both short, as *deus*. See FOOT.

PYRRHONIANS, **PYRRHONEANS**, or **PYRRHONISTS**, a sect of antient philosophers, so called from Pyrrho, a native of Elis, in Peloponnesus. The opinions of these philosophers, who were also called sceptics, terminated in the incomprehensibility of all things, in which they found reason both for affirming and denying; accordingly they seemed, during their whole lives, to be in search of truth, without ever acknowledging that they had found it: hence the art of disputing upon all things, without ever going farther than suspending our judgment, is called pyrrhonism.

Pyrrho maintained, that life and death were equally indifferent; and he is charged with teaching, that honour and infamy, the justice and injustice of actions, depended solely on human laws and customs; and in a word, that there is nothing in itself honest or dishonest, just or unjust: an abominable doctrine, that opens the way to all manner of crimes.

PYRUS, the PEAR-TREE, in botany, a genus of the icolandria-pentagynia class of plants, the corolla whereof consists of five roundish concave petals, inserted into the calyx; the fruit is an umbilicated apple, of a figure approaching to round, fleshy, and containing five cells, formed by membranes: the seeds are oblong, obtuse,

acuminated at the base, convex on one side, and plane on the other.

Under this genus is comprehended the apple and the quince-tree.

The fruit of this plant is refrigerating, astringent, &c.

PYTHAGOREANS, a sect of antient philosophers, so denominated from their being the followers of Pythagoras of Samos, who lived in the reign of Tarquin, the last king of the Romans, in the year of Rome 220; or, according to Livy, in the reign of Servius Tullius, in the year of the world 3472.

Pythagoras, from his extraordinary desire of knowledge, travelled in order to enrich his mind with the learning of the several countries through which he passed. He was the first who took the name of philosopher, that is, a lover of wisdom, which implied, that he did not ascribe the possession of wisdom to himself, but only the desire of possessing it.

His maxims of morality were admirable; for he was for having the study of philosophy solely tend to elevate man to a resemblance of the Deity. He believed that God is a soul diffused through all nature, and that from him human souls are derived; that they are immortal, and that men need only take pains to purge themselves of their vices, in order to be united to the Deity. He made unity the principle of all things; and believed, that between God and man there are various orders of spiritual beings, who are the ministers of the supreme being. He condemned all images of the Deity, and would have him worshipped with as few ceremonies as possible. His disciples brought all their goods into a common stock, contemned the pleasures of sense, abstained from swearing, eat nothing that had life, and believed in the doctrine of a metempsychosis. See the article METEMPSYCHOSIS.

Pythagoras made his scholars undergo a severe noviciate of silence for at least two years; and it is said, that where he discerned too great an itch for talking, he extended it to five: his disciples were therefore divided into two classes, of which the first were simple hearers, and the last such as were allowed to propose their difficulties, and learn the reasons of all that was taught there. The pythagoreans, it is said, on their rising from bed, roused the mind with the sound of the lyre, in order to make them more fit for the actions of the day; and at night re-

sumed the lyre, in order to prepare themselves for sleep, by calming all their tumultuous thoughts. The figurative manner in which he gave his instructions, was borrowed from the Hebrews, Egyptians, and other orientals. Some think he derived his philosophy from the books of Moses, and that he conversed with Ezekiel and Daniel at Babylon; but this is mere conjecture.

Some authors say, that he left nothing in writing; but Laërtius and others attribute several treatises to him. His golden verses, attributed by some to one of his disciples, are allowed to be an exact copy of the sentiments of that divine philosopher, from whose school proceeded the greatest philosophers and legislators.

PYTHEMA, in botany, a plant of the pentandria-monogynia class, with a monopetalous flower, divided into five linear segments, disposed star-ways; the fruit is a roundish trilocular capsule, containing a great many small and roundish seeds.

PYTHIA, in antiquity, the priestess of Apollo at Delphi, by whom he delivered oracles: she was thus called from the god himself, who was denominated Apollo Pythios, from his slaying the serpent Python.

This priestess was to be a pure virgin; she sat on the lid of a brazen vessel, mounted on a tripod or three-legged stool; and thence, after a violent enthusiasm, delivered her oracles in a few ambiguous and obscure verses, or in a short sentence in prose. See **ORACLE**.

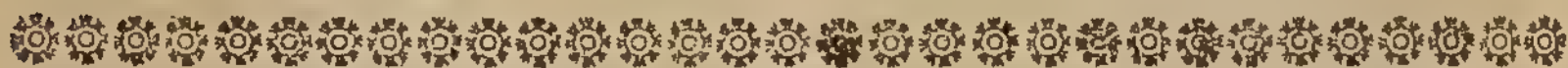
PYTHIAN GAMES, in antiquity, solemn games celebrated near Delphi, in honour of Apollo, and in remembrance of his having killed the serpent Python.

These were held every two years, about the month Elaphebolion, which answered to our February. The celebration of these games was attended with the pythian song, in which was celebrated the fight of Apollo and the serpent. The victors were crowned with branches of laurel; tho', at the first institution, the crown was of beech-leaves. See **GAMES**.

PYXIDIUM, **CUP-MOSS**, in botany, a genus of mosses, consisting of a firm, tough, and flexile matter, formed into the shape of hollowed cups, or drinking glasses, with longer or shorter stems.

PYXIS NAUTICA, the **SEAMAN'S COMPASS**. See the article **COMPASS**.

PYXIS, in anatomy, the acetabulum, or cavity of the hip-bone. See the articles **ACETABULUM** and **FEMUR**.



Q.

Q, or **q**, the sixteenth letter, and twelfth consonant, of our alphabet; but is not to be found either in the greek, old latin, or saxon alphabets; and indeed some would entirely exclude it, pretending that **k** ought to be used wherever this occurs: however, as it is formed in the voice in a different manner, it is undoubtedly a distinct letter; for in expressing this sound the cheeks are contracted, and the lips, particularly the under one, are put into a cannular form, for the passage of the breath.

The **q** is never sounded alone, but in conjunction with **u**, as in *quality*, *question*, *quite*, *quote*, &c. and never ends any english word.

As a numeral, **Q** stands for 100; and with a dash over it, thus **Q̄**, for 500000.

Used as an abbreviature, **q**. signifies quantity, or quantum: thus, among physicians, **q. pl.** is quantum placet, *i. e.* as

much as you please of a thing; and **q. f.** quantum sufficit, *i. e.* as much as is necessary. **Q. E. D.** among mathematicians, is quod erat demonstrandum, *i. e.* which was to be demonstrated; and **Q. E. F.** quod erat faciendum, *i. e.* which was to be done. **Q. D.** among grammarians, is quasi dictum, *i. e.* as if it were said, or, as who should say. In the notes of the antients, **Q.** stands for Quintus, or Quintius; **Q. B. V.** for quod bene vertat; **Q. S. S. S.** for quæ supra scripta sunt; **Q. M.** for Quintus Mutius, or quomodo; **Quint.** for Quintilius; and **Quæst.** for quæstor.

QUACK, among physicians, the same with empiric. See the article **EMPIRIC**.

QUADRA, in building, any square bordure, or frame, encompassing a basso relievo, pannel, painting, or other work: it is also used, but erroneously, for a frame or bordure, of any other form, as round, oval, or the like.

QUADRAGESIMA, a denomination given

given to lent, from its consisting of forty days. See the article LENT.

Hence also the first Sunday of lent is called Quadragesima-sunday, and the three preceding Sundays, Quinquagesima, Sexagesima, and Septuagesima.

QUADRANGLE, in geometry, the same with a quadrilateral figure, or one consisting of four sides and four angles. See the article QUADRILATERAL.

QUADRANS, the quarter or fourth part of any thing, particularly the *as*, or pound. See the article *As*.

QUADRANT, *quadrans*, in geometry, an arch of a circle, containing 90° , or the fourth part of the entire periphery. See the articles CIRCLE and DEGREE. Sometimes also the space, or area, included between this arch and two radii drawn from the center to each extremity thereof, is called a quadrant, or, more properly, a quadrantal space, as being a quarter of an entire circle.

QUADRANT also denotes a mathematical instrument, of great use in astronomy and navigation, for taking the altitudes of the sun and stars, as also for taking angles in surveying, &c.

This instrument is variously contrived, and furnished with different apparatus, according to the various uses it is intended for; but they all have this in common, that they consist of a quarter of a circle, whose limb is divided into 90° . Some have a plummet suspended from the center, and are furnished with sights to look through.

The principal and most useful quadrants are the common surveying quadrant, astronomical quadrant, Adam's quadrant, Cole's quadrant, Davis's quadrant, Gunter's quadrant, Hadley's quadrant, horodistical quadrant, Sutton's or Collin's quadrant, and the sinical quadrant, &c. of each of which in order.

I. The common surveying quadrant, ABC (pl. CCXXII. fig. 1. n^o 1. is made of brass, wood, or any other solid substance; the limb of which BC, is divided into 90° , and each of these farther divided into as many equal parts as the space will allow; either diagonally or otherwise. On one of the semi-diameters AC, are fitted two moveable sights; and to the center is sometimes also fixed a label, or moveable index AD, bearing two other sights; but in lieu of these last sights there is sometimes fitted a telescope: also from the center there is hung a thread with a plummet; and on the under side,

or face of the instrument is fitted a ball and socket, by means of which it may be put into any position. The general use of it is for taking angles in a vertical plane, comprehended under right lines going from the center of the instrument, one of which is horizontal, and the other is directed to some visible point. But besides the parts already described, there is frequently added on the face near the center, a kind of compartment, EF, called the quadrat, or geometrical square; which is divided as in the figure, and will be farther described under the article QUADRAT.

This quadrant may be used in different situations: for observing heights or depths, its plane must be disposed perpendicularly to the horizon; but to take horizontal distances, its plane is disposed parallel thereto: again, heights and distances may be taken two ways, viz. by means of the fixed sights and plummet, or by the label.

As to the manner of measuring angles by this quadrant: Let there be an angle in a vertical plane, comprehended between a line parallel to the horizon HK and the right line RA, (*ibid.* n^o 2.) coming from the sun, moon, a star, or any remarkable point of a tower, or hill: now to measure this angle RAH by the quadrant, let the instrument be placed in the vertical plane, so as that its center A may be in the angular point, and let the sights on the side CA be directed towards the object at R; then the degrees and minutes in the arch BD, cut off by the plummet or perpendicular, AD, will measure the angle RAH: for, from the make of the quadrant, BAC is a right angle; therefore BAR is likewise a right angle, being equal to it. But, because HK is horizontal, and AD perpendicular to the horizon, HAD will be a right angle; and therefore BAR = HAD, and BAR - HAB = HAD - HAB, or RAH = BAD: but the arch BD is the measure of the angle BAD, consequently it is likewise the measure of RAH. *Q. E. D.*

The remaining arch on the quadrant, DC, is the measure of the angle RAZ, comprehended between the foresaid right line, RA, and AZ which points to the zenith; so that the arch DC measures, or is equal to the zenith distance = LPAZ. For the farther use of this instrument, in measuring heights and distances, as also for taking angles like a graphometer.

ter. See the articles HEIGHT, GRAPHOMETER, SURVEYING, &c.

2. The astronomical quadrant is a large one usually made of brass, or wooden bars faced with iron-plates; having its limb, FE, (pl. CCXXII. fig. 2.) nicely divided either diagonally, or otherwise, into degrees, minutes, and seconds; and furnished with two telescopes, one fixed on the side of the quadrant, at AB; and the other CD, moveable about the center, by means of the screw, G. The dented wheels, (I, H,) serve to direct the instrument to any object, or phenomenon.

The use of this curious instrument, in taking observations of the sun, planets, and fixed stars, is obvious; for being turned horizontally upon its axis, by means of the telescope AB, till the object is seen through the removeable telescope; then the degrees, &c. cut by the index, give the altitude required.

3. Adams's quadrant differs only from Cole's quadrant, in having an horizontal vane, with the upper part of the limb lengthened; so that the glass, which casts the solar spot on the horizon-vane, is at the same distance from the horizon-vane as the sight-vane at the end of the index.

4. Cole's quadrant is a very useful instrument invented by Mr. Benjamin Cole: it consists of six parts, *viz.* the staff AB (pl. CCXXII. fig. 3.) the quadrantal-arch DE; three vanes A, B, C; and the vernier, FG.

The staff is a bar of wood about two feet long, an inch and a quarter broad, and of a sufficient thickness to prevent it from bending or warping. The quadrantal arch is also of wood, being nearly equal in strength to the small arch of Davis's quadrant, and is divided into degrees, and third parts of a degree, to a radius of about nine inches; to its extremities are fixed two radii, which meet in the center of the quadrant by a pin, round which it easily moves. The sight-vane A is a thin piece of brass almost two inches in height, and one broad, placed perpendicularly on the end of the staff A, by the help of two screws passing through its foot. Through the middle of this vane is drilled a small hole, like that in the sight vane of Davis's quadrant, through which the coincidence or meeting of the horizon and solar spot is to be viewed. The horizon-vane B is about an inch broad, and two inches and a half high, having a slit

cut through it of near an inch long, and a quarter of an inch broad; this vane is fixed in the center-pin of the instrument, in a perpendicular position, by the help of two screws passing through its foot, whereby its position, with respect to the sight-vane, is always the same; their angle of inclinations being equal to forty-five degrees. The shade-vane C is composed of two brass plates; the one, which serves as an arm, is about four inches and a half long, and three quarters of an inch broad, being pinned, at one end, to the upper limb of the quadrant by a screw, about which it has a small motion; the other end lies in the arch, and the lower edge of the arm is directed to the middle of the center-pin: the other plate, which is properly the vane, is about two inches long, being fixed perpendicularly to the other plate, at about half an inch distance from that end next the arch; this vane may be used either by its shade, or by the solar spot cast by a convex lens placed therein. And, because the wood-work is often apt to warp or twist, therefore this vane may be rectified by the help of a screw, so that the warping of the instrument may occasion no error in the observation, which is performed in the following manner:—set the line G on the vernier against a degree on the upper limb of the quadrant, and turn the screw on the backside of the limb forward or backward, till the hole in the sight-vane, the center of the glass, and the sunk spot in the horizon-vane, lie in a right-line.

To find the sun's altitude by this instrument: turn your back to the sun, holding the instrument by the staff, with your right hand, so that it be in a vertical plane passing through the sun; apply your eye to the sight-vane, looking through that and the horizon-vane till you see the horizon; with the left hand slide the quadrantal arch upwards, until the solar spot or shade, cast by the shade-vane, fall directly on the spot or slit in the horizon-vane; then will that part of the quadrantal arch, which is raised above G or S (according as the observation respected either the solar spot or shade) shew the altitude of the sun at that time. But, if the meridian altitude be required, the observation must be continued, and, as the sun approaches the meridian, the sea will appear through the horizon-vane, and then is the observation finished; and the degrees and minutes counted as before, will give

give the sun's meridian altitude: or the degrees counted from the lower limb upwards will give the zenith-distance.

5. Davis's quadrant, so called from its inventor captain Davis, has already been described under the article BACK-STAFF.

This instrument has got the name of back-staff, because the observer's back is turned towards the sun, in taking its altitude: it is also called, especially among foreigners, the english quadrant.

6. Gunter's quadrant, so called from its inventor Edmund Gunter, is represented in plate CCXXII. fig. 4; and besides the apparatus of other quadrants, has a stereographical projection of the sphere on the plane of the equinoctial. It has also a calendar of the months, next to the divisions of the limb.

Use of Gunter's quadrant. 1. To find the sun's meridian altitude for any given day, or the day of the month for any given meridian altitude. Lay the thread to the day of the month in the scale next the limb; and the degree it cuts in the limb, is the sun's meridian altitude. Thus the thread, being laid on the 15th of May cuts $59^{\circ} 30'$, the altitude sought; and contrarily the thread, being set to the meridian altitude, shews the day of the month. 2. To find the hour of the day. Having put the bead, which slides on the thread, to the sun's place in the ecliptic, observe the sun's altitude by the quadrant; then, if the thread be laid over the same in the limb, the bead will fall upon the hour required. Thus suppose on the 10th of April, the sun being then in the beginning of Taurus, I observe the sun's altitude by the quadrant to be 36° ; I place the bead to the beginning of Taurus in the ecliptic, and lay the thread over 36° of the limb; and find the bead to fall on the hour-line marked 3 and 9: accordingly the hour is either 9 in the morning, or 3 in the afternoon. Again, laying the bead on the hour given, having first rectified, or put it to the sun's place, the degree cut by the thread on the limb gives the altitude. Note, the bead may be rectified otherwise, by bringing the thread to the day of the month, and the bead to the hour-line of 12. 3. To find the sun's declination from his place given, and contrariwise. Set the bead to the sun's place in the ecliptic, move the thread to the line of declination E T, and the bead will cut the degree of declination required. Contrarily, the bead being

adjusted to a given declination, and the thread moved to the ecliptic, the bead will cut the sun's place. 4. The sun's place being given, to find his right ascension, or contrarily. Lay the thread on the sun's place in the ecliptic, and the degree it cuts on the limb is the right ascension sought. Contrarily, laying the thread on the right ascension, it cuts the sun's place in the ecliptic. 5. The sun's altitude being given, to find his azimuth, and contrariwise. Rectify the bead for the time, as in the second article, and observe the sun's altitude; bring the thread to the complement of that altitude; thus the bead will give the azimuth sought, among the azimuth lines. 6. To find the hour of the night from some of the five stars laid down on the quadrant. 1. Put the bead to the star you would observe, and find how many hours it is off the meridian, by article 2. Then, from the right ascension of the star, subtract the sun's right ascension converted into hours, and mark the difference; which difference, added to the observed hour of the star from the meridian, shews how many hours the sun is gone from the meridian, which is the hour of the night. Suppose on the 15th of May the sun is in the 4th degree of gemini, I set the bead to arcturus; and, observing his altitude, find him to be in the west about 52° high, and the bead to fall on the hour-line of 2 in the afternoon; then will the hour be 11 hours 50 min. past noon, or 10 min. short of midnight: for 62° , the sun's right ascension, converted into time, make 4 hours 8 min. which subtracted from 13 hours 58 min. the right ascension of arcturus, the remainder will be 9 hours 50 min. which added to 2 hours, the observed distance of arcturus from the meridian, shews the hour of the night to be 11 hours 50 minutes.

7. Hadley's quadrant, (plate CCXXII. fig. 5.) so called from its inventor J. Hadley, esq; consists of the following particulars: 1. An octant, or $\frac{1}{8}$ part of a circle, A B C. 2. An index D. 3. The speculum E. 4. Two horizontal glasses, F, G. 5. Two screens, K, K. 6. Two sight-vanes, H, I.

The octant consists of two radii, A B, A C, which are strengthened by the braces L, M, and the arch B C; which though containing only 45° , is nevertheless divided into 90 primary divisions, each

each of which stands for degrees, and are numbered 0, 10, 20, 30, &c. to 90; beginning at each end of the arch for the convenience of numbering both ways, either for altitudes or zenith-distances: again, each degree is subdivided into minutes.

The index D, is a flat bar, moveable round the center of the instrument; and that part of it which slides over the graduated arch, B C, is open in the middle, with Vernier's scale on the lower part of it; and underneath is a screw, serving to fasten the index against any division.

The speculum E, is a piece of flat glass, quicksilvered on one side, set in a brass-box, and placed perpendicular to the plane of the instrument, the middle part of the former coinciding with the center of the latter. And, because the speculum is fixed to the index, the position of it will be altered by the moving of the index along the arch. The rays of an observed object are received on the speculum, and from thence reflected on one of the horizon-glasses, F, G; which are two small pieces of looking-glass placed on one of the limbs, their faces being turned obliquely to the speculum, from whence they receive the reflected rays of observed objects. This glass, F, has only its lower part quicksilvered, and set in brass-work; the upper part being left transparent to view the horizon. The glass G has in its middle a transparent slit, through which the horizon is to be seen. And because the warping of the wood-work, and other accidents, may distend them from their true situation, there are three screws passing through their feet, whereby they may be easily replaced. The screens are two pieces of coloured glass, set in two square brass-frames K, K, which serve as screens to take off the glare of the sun's rays which would be otherwise too strong for the eye; the one is tinged much deeper than the other, and, as both of them move on the same center, they may be both or either of them used: in the situation they appear in the figure, they serve for the horizon-glass F; but, when they are wanted for the horizon-glass G, they must be taken from their present situation, and placed on the quadrant above G.

The sight-vanes are two pins, H and I, standing at right angles to the plane of the instrument; that at H has one hole in it, opposite to the transparent slit in the horizon-glass G; the other, at I, has

two holes in it, the one opposite to the middle of the transparent part of the horizon-glass F, the other rather lower than the quicksilvered part: this vane has a piece of brass on the back of it, which moves round a center, and serves to cover either of the holes.

There are two sorts of observations to be made with this instrument; the one, when the back of the observer is turned towards the object, and therefore called the back-observation; the other, when the face of the observer is turned towards the object, which is called the fore-observation. To rectify the instrument for the fore-observation: slacken the screw in the middle of the handle behind the glass F; bring the index close to the button b; hold the instrument in a vertical position, with the arch downwards; look through the right hand hole in the vane I, and through the transparent part of the glass F, for the horizon; and if it lies in the same right line with the image of the horizon, seen on the quicksilvered part, the glass F is rightly adjusted; but, if the two horizon-lines disagree, turn the screw at the end of the handle backwards or forwards, until those lines coincide, then fasten the middle screw of the handle, and the glass is rightly adjusted.

To take the sun's altitude by the fore-observation: having fixed the screens above the horizon-glass F, and suited them proportionally to the strength of the sun's rays, turn your face towards the sun, holding the instrument with your right hand, by the braces L, M, in a vertical position, with the arch downwards; put your eye close to the right hand hole in the vane I, and view the horizon through the transparent part of the horizon-glass F, moving at the same time the index D, with your left hand, till the reflex solar spot coincides with the line of the horizon; then the degrees counted from C, or that end next your body, will give the altitude of the sun at that time, observing to add or subtract 16 min. according as the upper or lower edge of the sun's reflex image is made use of. But to obtain the sun's meridian altitude, which is the thing wanted, in order to find the latitude; the observations must be continued, and, as the sun approaches the meridian, the index D must be continually moved towards B, in order to maintain the coincidence between the reflex solar spot and the horizon;

zon; and consequently, as long as this motion can maintain the same coincidence, the observation must be continued and when the sun has attained the meridian, and begins to descend, the coincidence will require a retrograde motion of the index, or towards C; and then is the observation finished, and the degrees counted, as before, will give the sun's meridian altitude, or those from B, the zenith-distance; observing to add $16' =$ semidiam. \odot , if the sun's lower edge is brought to the horizon; or to subtract $16'$, when the horizon and upper edge coincide. To take the altitude of a star by the fore-observation: through the vane H, and the transparent slit in the glass G, look directly to the star; and at the same time move the index, till the image of the horizon behind you, being reflected by the great speculum, is seen in the quick-silvered part of G, and meets the star; then will the index shew the degrees of the star's altitude.

To rectify the instrument for the back observation: slacken the screw in the middle of the handle, behind the glass G; turn the button *b* on one side, and bring the index as many degrees before *o*, as is twice the dip of the horizon at your height above the water; hold the instrument vertical with the arch downwards, look through the hole of the vane H, and if the horizon, seen through the transparent slit in the glass G, coincides with the image of the horizon, seen in the quick-silvered part of the same glass; then the glass G is in its proper position. But if not, set it by the handle, and fasten the screw as before.

To take the sun's altitude by the back observation: put the stem of the screens K, K, into the hole *r*, and, in proportion to the strength or faintness of the sun's rays, let one, both, or neither of the frames of those glasses be turned close to the face of the limb; hold the instrument in a vertical position, with the arch downwards, by the braces L, M, with your left hand; turn your back towards the sun, and put your eye close to the hole, in the vane H, observing the horizon through the transparent slit in the horizon-glass G; with your right hand move the index D, till the reflected image of the sun be seen in the quick-silvered part of the glass G, and in a right line with the horizon; swing your body to and fro, and if the observation be well made, the sun's image will be

observed to brush the horizon, and the degrees reckoned from C, or that part of the arch farthest from your body, will give the sun's altitude, at the time of observation; observing to add $16 \text{ min.} =$ the sun's semidiameter, if the sun's upper edge be used; and subtract 16 min. from the altitude, if the observation respected the lower edge.

The directions here given, especially if joined with those delivered under the article LATITUDE, for taking of altitudes at sea, would be sufficient, were there not two corrections necessary to be made, before the altitude can be accurately assigned, *viz.* one on account of the observer's eye being raised above the level of the sea, and the other on account of the refraction occasioned in small altitudes by the haziness of the atmosphere.

We shall therefore give a table, shewing the corrections necessary to be made to altitudes on both these accounts, whether it be taken by Davis's or Hadley's quadrant, or any other instrument.

| height of the eye in feet. | corrections in minutes. | altitude in degrees. | corrections in minutes. | altitude in degrees. | corrections in minutes. |
|-------------------------------|----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|
| 5 | 2' | 1 | 23' | 12 | 4' |
| 10 | 3' | 2 | 17 $\frac{1}{2}$ ' | 15 | 3 $\frac{1}{2}$ ' |
| 15 | 4' | 3 | 14' | 20 | 2 $\frac{1}{2}$ ' |
| 20 | 5' | 4 | 11' | 25 | 2' |
| 25 | 5 $\frac{1}{2}$ ' | 5 | 9' | 30 | 1 $\frac{1}{2}$ ' |
| 30 | 6' | 6 | 8' | 35 | 1 $\frac{1}{3}$ ' |
| 35 | 6 $\frac{1}{2}$ ' | 7 | 7' | 40 | 1' |
| 40 | 7' | 8 | 6' | 50 | 0 $\frac{3}{4}$ ' |
| 45 | 7 $\frac{1}{2}$ ' | 9 | 5 $\frac{1}{2}$ ' | 60 | 0 $\frac{1}{2}$ ' |
| 50 | 8' | 10 | 5' | 70 | 0 $\frac{1}{4}$ ' |

General rules for using this table of corrections. 1. In the fore-observations: add the sum of the corrections to the observed zenith-distance, for the true zenith-distance; or, take the sum of the corrections from the observed altitude, and the remainder will be the altitude. 2. In the back-observations, add the dips, or corrections for the height of the eye, and subtract the refractions, for altitudes; and for zenith-distances, subtract the dips, and add the refractions. Example: By a back observation, the altitude of the sun's lower edge was found by Hadley's quadrant to be $25^{\circ} 12'$; the eye being 30 feet above the horizon.

rizon. By the table the dip on 30 feet is $6'$, and the refraction on 25° is $2'$; therefore $25^\circ 12' - 16' (= \text{semidiam } \odot) = 24^\circ 56'$, and $24^\circ 56' + 6' (\text{by rule 2}) = 25^\circ 2'$, and lastly $25^\circ 2' - 2' (\text{by rule 2}) = 25^\circ = \text{the true, or corrected altitude.}$

We have been the more particular in our description and use of Hadley's quadrant, as it is undoubtedly the best hitherto invented.

8. Horodictical quadrant, a pretty commodious instrument, so called from its use in telling the hour of the day.

Its construction is this: from the center of the quadrant, C, (plate CCXXII. fig. 6.) whose limb AB is divided into 90° , describe seven concentric circles at intervals at pleasure; and to these add the signs of the zodiac, in the order represented in the figure. Then, applying a ruler to the center C, and the limb AB, mark upon the several parallels the degrees corresponding to the altitude of the sun when therein, for the given hours; connect the points belonging to the same hour with a curve line, to which add the number of the hour. To the radius CA fit a couple of sights, and to the center of the quadrant C tie a thread with a plummet, and upon the thread a bead to slide.

If now the bead be brought to the parallel wherein the sun is, and the quadrant directed to the sun, till a visual ray pass thro' the sights, the bead will shew the hour. For the plummet, in this situation, cuts all the parallels in the degrees corresponding to the sun's altitude. Since then the bead is in the parallel which the sun describes, and thro' the degrees of altitude to which the sun is elevated every hour, there pass hour-lines, the bead must shew the present hour. Some represent the hour-lines by arches of circles, or even by straight lines, and that without any sensible error.

9. Sutton's or Collins's Quadrant, (plate CCXXIII. fig. 1.) is a stereographic projection of one quarter of the sphere, between the tropics, upon the plane of the ecliptic, the eye being in its north-pole; it is fitted to the latitude of London. The lines, running from the right hand to the left, are parallels of altitude; and those crossing them are azimuths. The lesser of the two circles, bounding the projection, is one fourth of the tropic of capricorn; the greater is one fourth

of that of cancer. The two ecliptics are drawn from a point on the left edge of the quadrant, with the characters of the signs upon them; and the two horizons are drawn from the same point. The limb is divided both into degrees and time; and, by having the sun's altitude, the hour of the day may be found here to a minute.

The quadrantal arches next the center contain the calendar of months; and under them, in another arch, is the sun's declination.

On the projection are placed several of the most noted fixed stars between the tropics; and the next below the projection is the quadrant and line of shadows.

To find the time of the sun's rising or setting, his amplitude, his azimuth, hour of the day, &c. by this quadrant; lay the thread over the day and the month, and bring the bead to the proper ecliptic, either of summer or winter, according to the season, which is called rectifying; then, moving the thread, bring the bead to the horizon, in which case the thread will cut the limb in the time of the sun's rising or setting, before or after six; and at the same time the bead will cut the horizon in the degrees of the sun's amplitude.

Again, observing the sun's altitude with the quadrant, and supposing it found 45° on the fifth of May, lay the thread over the fifth of May, bring the bead to the summer ecliptic, and carry it to the parallel of altitude 45° ; in which case the thread will cut the limb at $55^\circ 15'$, and the hour will be seen among the hour-lines to be either $41'$ past nine in the morning, or $19'$ past two in the afternoon.

Lastly, the bead among the azimuths shews the sun's distance from the south $50^\circ 41'$.

But note, that if the sun's altitude be less than what it is at six o'clock, the operation must be performed among those parallels above the upper horizon; the bead being rectified to the winter ecliptic.

10. Sinical quadrant (pl. CCXXIII. fig. 2.) consists of several concentric quadrantal arches, divided into eight equal parts by radii, with parallel right lines crossing each other at right angles.

Now any one of the arches, as BC. may represent a quadrant of any great circle of the sphere, but is chiefly used for the horizon

QUADRANTS.
Fig. 1. Sutton's Quadrant

3

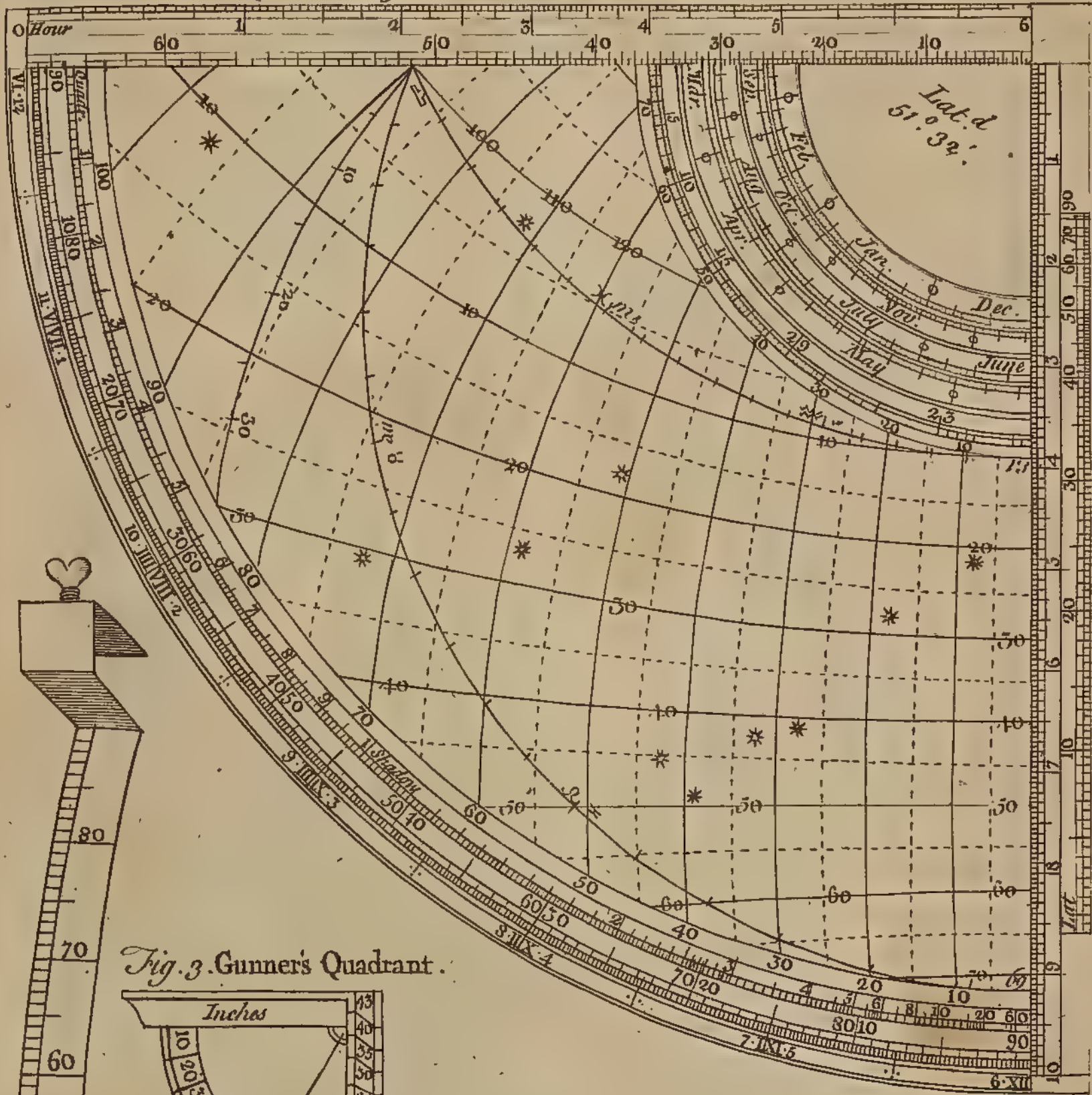


Fig. 3. Gunner's Quadrant.



Fig. 4. The Quadrant of Altitude.

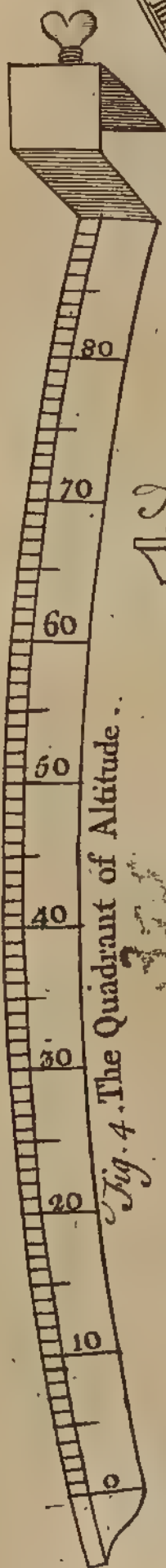
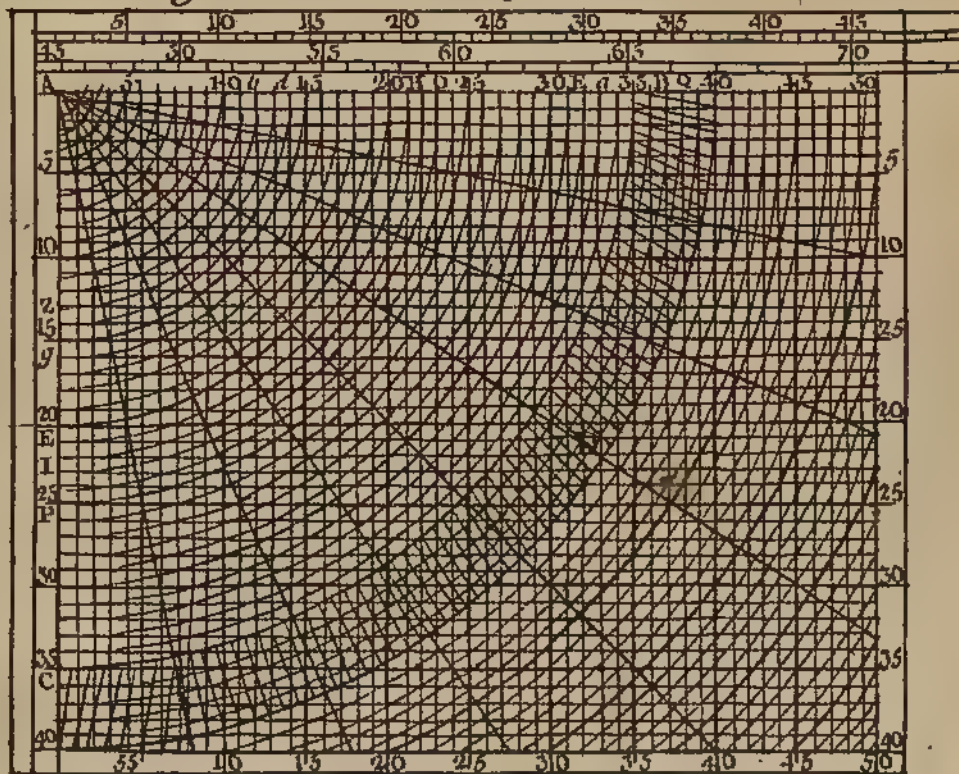


Fig. 2. The Sinical Quadrant.



horizon or meridian. If then BC be taken for a quadrant of the horizon, either of the sides, as AB, may represent the meridian; and the other side, AC, will represent a parallel, or line of east and west; and all the other lines, parallel to AB, will also be meridians; and all those parallel to AC, east and west lines, or parallels.

Again, the eight spaces into which the arches are divided by the radii, represent the eight points of the compass in a quarter of the horizon; each containing $11^{\circ} 15'$.

The arch BC is likewise divided into 90° , and each degree subdivided into $12'$, diagonal-wise.

To the center is fixed a thread, which, being laid over any degree of the quadrant, serves to divide the horizon.

If the sinical quadrant be taken for a fourth part of the meridian, one side thereof, AB, may be taken for the common radius of the meridian and equator; and then the other, AC will be half the axis of the world. The degrees of the circumference, BC, will represent degrees of latitude, and the parallels to the side AB, assumed from every point of latitude to the axis AC, will be radii of the parallels of latitude, as likewise the sine complement of those latitudes.

Suppose then it be required to find the degrees of longitude contained in 83 of the lesser leagues, in the parallel of 48° ; lay the thread over 48° of latitude on the circumference, and count thence the 83 leagues, on AB beginning at A; this will terminate in H, allowing every small interval 4 leagues. Then tracing out the parallel HE, from the point H to the thread; the part AE of the thread shews that 125 greater or equinoctial leagues make $6^{\circ} 15'$; and therefore that the 83 lesser leagues AH, which make the difference of longitude of the course, and are equal to the radius of the parallel HE, make $6^{\circ} 15'$ of the said parallel.

If the ship sails an oblique course, such course, besides the north and south greater leagues, gives lesser leagues easterly and westerly, to be reduced to degrees of longitude of the equator. But these leagues being made neither on the parallel of departure, nor on that of arrival, but in all the intermediate ones; we must find a mean proportional parallel between them.

To find this, we have on the instrument a scale of cross latitudes. Suppose then

it were required to find a mean parallel between the parallels of 40° and 60° ; with your compasses take the middle between the 40th and 60th degree on the scale: this middle point will terminate against the 51st degree, which is the mean parallel required.

The principal use of the sinical quadrant is to form triangles upon, similar to those made by a ship's way, with the meridians and parallels; the sides of which triangles are measured by the equal intervals between the concentric quadrants, and the lines N and S, E and W; and every fifth line and arch is made deeper than the rest.

Now suppose a ship to have sailed 150 leagues north-east, one fourth north, which is the third point, and makes an angle of $33^{\circ} 45'$ with the north-part of the meridian: here are given the course and distance sailed, by which a triangle may be formed on the instrument, similar to that made by the ship's course; and hence the unknown parts of the triangle may be found. Thus supposing the center A to represent the place of departure; count, by means of the concentric circles along the point the ship sailed on, *viz.* AD, 150 leagues: then in the triangle AED, similar to that of the ship's course, find AE = difference of latitude; and DE = difference of longitude, which must be reduced according to the parallel of latitude come to. See the article LONGITUDE, &c.

11. Gunner's quadrant (plate CCXXIII, fig. 3.) sometimes called gunner's square, is that used for elevating and pointing cannon, mortars, &c. and consists of two branches either of brass or wood, between which is a quadrantal arch divided into 90° , beginning from the shorter branch, and furnished with a thread and plummet, as represented in the plate above referred to.

The use of the gunner's quadrant is extremely easy; for if the longest branch be placed in the mouth of the piece, and it be elevated till the plummet cut the degree necessary to hit a proposed object, the thing is done.

Sometimes on one of the surfaces of the long branch, are noted the division of diameters, and weights of iron bullets, as also the bores of pieces.

QUADRANT of altitude, (plate CCXXIII, fig. 4.) is an appendage of the artificial globe, consisting of a lamina, or slip of brass, the length of a quadrant of one of

the great circles of the globe, and graduated. At the end, where the division terminates, is a nut riveted on, and furnished with a screw, by means whereof the instrument is fitted on to the meridian, and moveable round upon the rivet, to all points of the horizon, as represented in the figure referred to.

Its use is to serve as a scale in measuring of altitudes, amplitudes, azimuths, &c. See the article GLOBE.

QUADRANTAL, in roman antiquity, a vessel every way square like a die, serving as a measure of liquids: its capacity was eighty libræ or pounds of water, which made forty-eight sextaries, two urnæ, or eight congii.

QUADRANTAL TRIANGLE, a spherical triangle, one of whose sides at least is a quadrant of a circle, and one of its angles a right angle. See TRIANGLE.

QUADRAT, *quadratum*, a mathematical instrument, called also a geometrical square, and line of shadows: it is frequently an additional member on the face of the common quadrant, as also on those of Gunter's and Sutton's quadrant; but we shall describe it by itself, as being a distinct instrument.

It is made of any solid matter, as brass, wood, &c. or of any four plain rules joined together at right angles, as represented in plate CCXXIV. fig. 1. n° 1. where A is the center, from which hangs a thread with a small weight at the end, serving as a plummet. Each of the sides, BE, and DE, is divided into an hundred equal parts; or, if the sides be long enough to admit of it, into a thousand parts; C and F are two sights, fixed on the side AD. There is, moreover, an index GH, which, when there is occasion, is joined to the center A, in such a manner as that it can move freely round, and remain in any given situation: on this instrument are two sights, K, L, perpendicular to the right line going from the center of the instrument. The side DE is called the upright side, or the line of the direct or upright shadows; and the side BE is termed the reclining side, or the line of the versed or back-shadows.

To measure an accessible height, AB, (*ibid.* n° 2.) by the quadrat, let the distance BD be measured, which suppose = 96 feet, and let the height of the observer's eye be 6 feet; then holding the instrument with a steady hand, or rather resting it on a support, let it be directed

towards the summit A, so that it may be seen clearly through both sights; the perpendicular or plum-line mean while hanging free, and touching the surface of the instrument: let now the perpendicular be supposed to cut off on the upper side, KN, 80 equal parts; it is evident, that LKN, ACK, are similar triangles, and (by prop. 4. lib. 6. of Euclid) NK:KL::KC (i. e. BD):CA; that is, 80:100::96:CA; therefore, by the rule of three, $CA = \frac{96 \times 100}{80} = 120$ feet; and CB = 6 feet

being added, the whole height BA is 126 feet.

If the observer's distance, as DE (*ibid.*) be such, that, when the instrument is directed as formerly towards the summit A, the perpendicular fall on the angle P, and the distance BE or CG be 120 feet, CA will also be 120 feet: for PG:GH::GC:CA; but PG = GH, therefore GC = CA; that is, CA will be 120 feet, and the whole height BA = 126 feet, as before.

But let the distance BF (*ibid.*) be 300 feet, and the perpendicular or plum-line cut off 40 equal parts from the reclining side. Now, in this case, the angles QAC, QZI, are equal (29. 1. Eucl.) as are also the angles QZI, ZIS: therefore $\angle ZIS = \angle QAC$; but $\angle ZSI = \angle QCA$, as being both right: hence, in the æquangular triangles ACQ, SZI, we have (by 4. 6. Eucl.) ZS:SI::CQ:CA; that is, 100:40::300:CA, or $CA = \frac{40 \times 300}{100} = 120$; and by adding

6 feet, the observer's height, the whole height BA will be 126 feet.

To measure any distance, at land or sea, by the quadrat. In this operation, the index AH is to be applied to the instrument, as was shown in the description; and, by the help of a support, the instrument is to be placed horizontally at the point A (*ibid.* n° 3.) then let it be turned till the remote point, F, whose distance is to be measured, be seen through the fixed sights: and bringing the index to be parallel with the other side of the instrument, observe through its sights any accessible mark B, at a distance; then carrying the instrument to the point B, let the immoveable sights be directed to the first station A, and the sights of the index to the point F. If the index cut the right side of the square, as in K, the

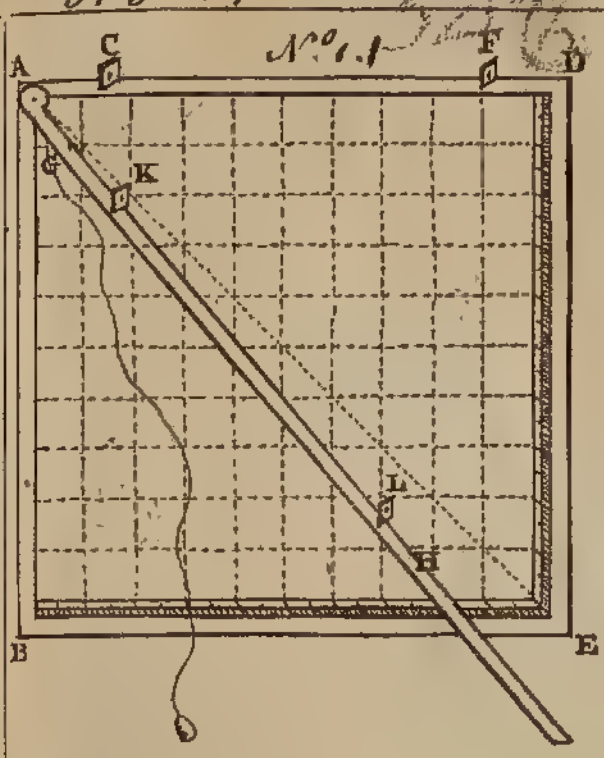


Fig. 1. QUADRAT.

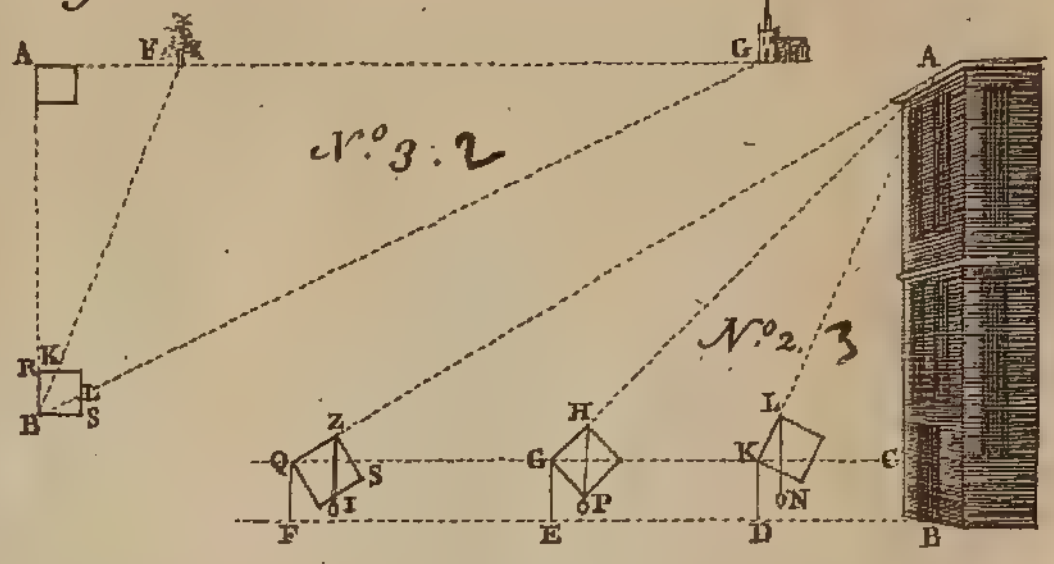
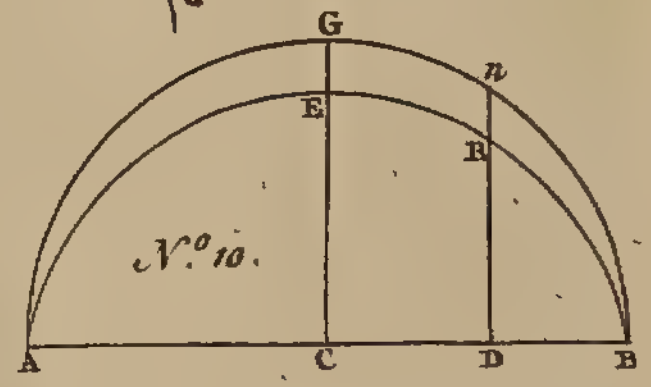
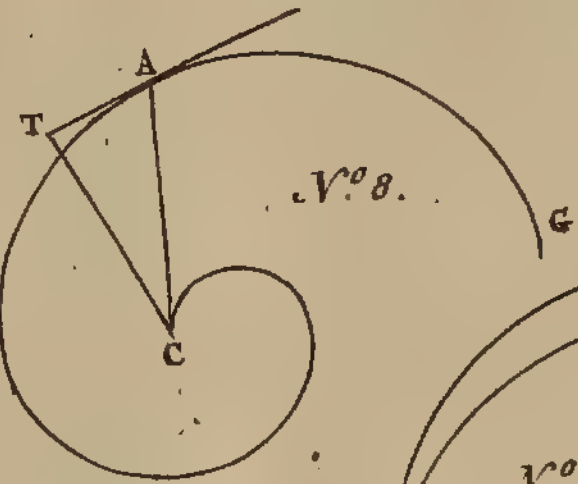
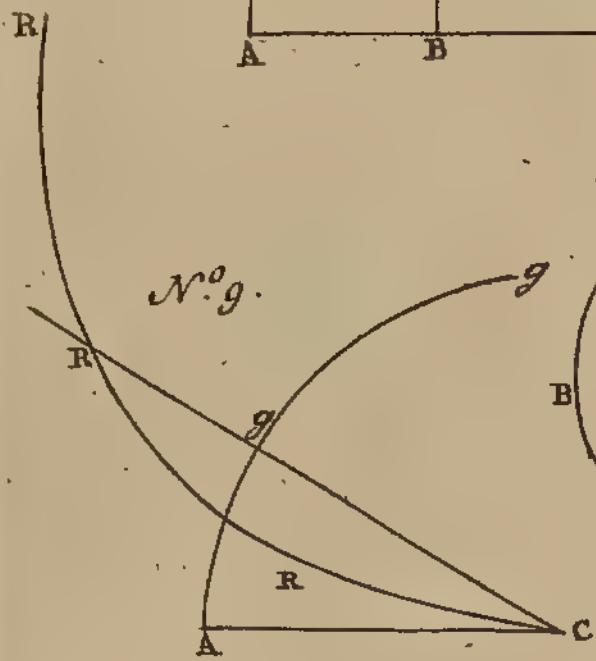
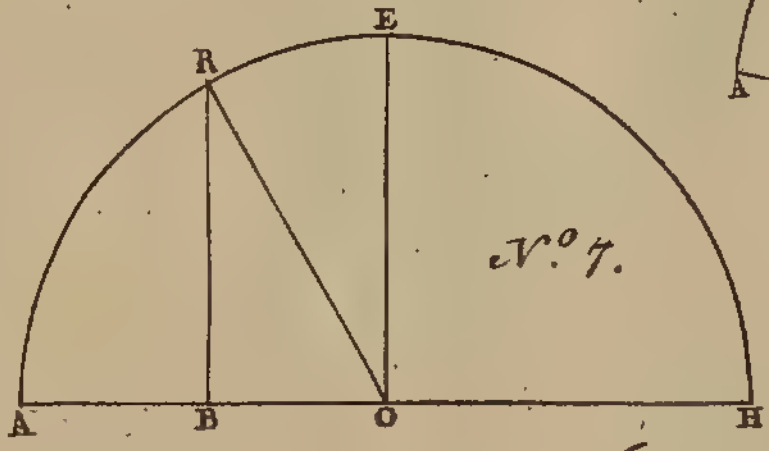
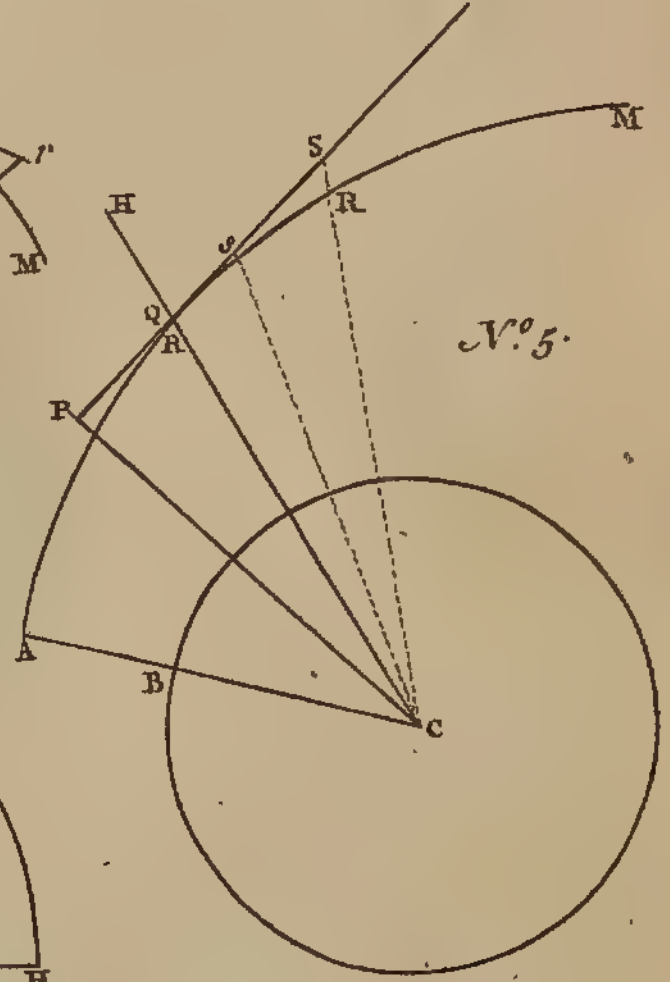
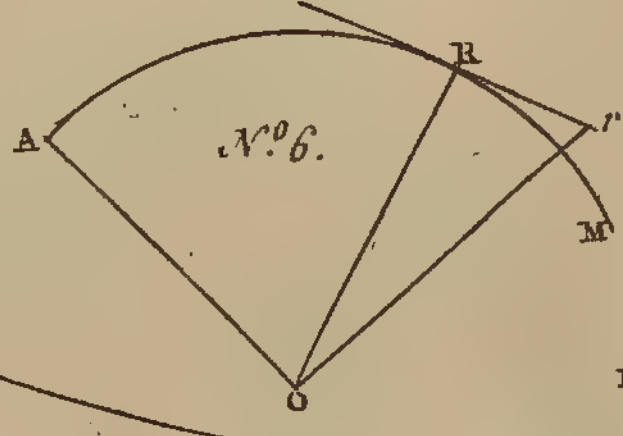
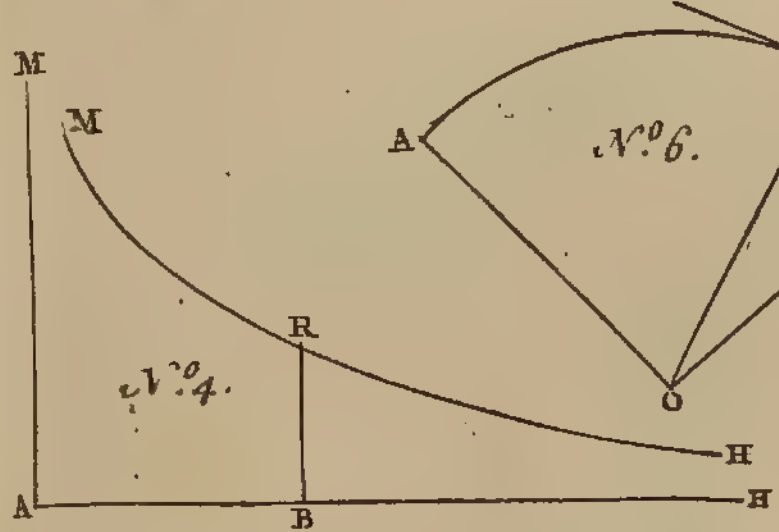
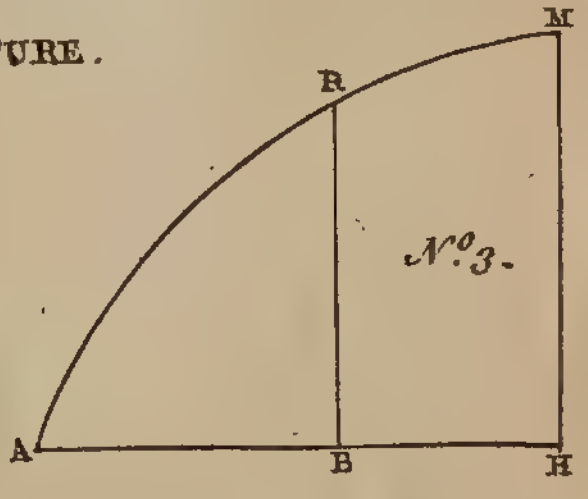
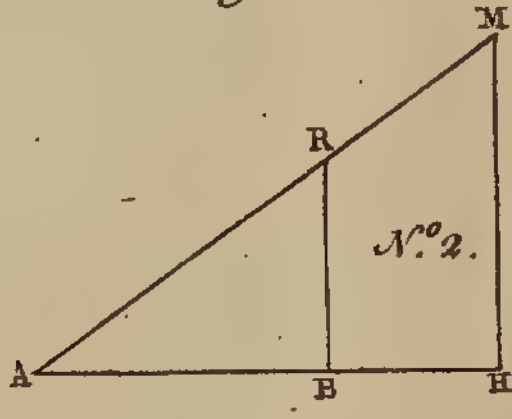
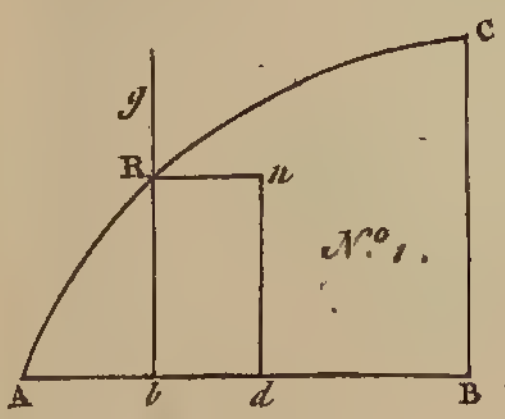


Fig. 2. QUADRATURE.





proportion will be (by 4. 6.) $BR : RK :: BA$ (the distance of the stations to be measured with a chain) : AF , the distance sought. But if the index cut the reclined side of the square, in the point L ; then the proportion is $LS : SB :: BA : AG$, the distance sought; which, accordingly, may be found by the rule of three.

QUADRAT, in astrology, the same with quartile. See the article **QUARTILE**.

QUADRAT, in printing, a piece of metal cast like the letters, to fill up the void spaces between words, &c. There are quadrats of different sizes, as m quadrats, n quadrats, &c. which are, respectively, of the dimensions of these letters.

QUADRATA LEGIO, a square legion, in roman antiquity, one consisting of four thousand men. See **LEGION**.

QUADRATIC EQUATION, in algebra, that wherein the unknown equality is of two dimensions, or raised to the second power. See **EQUATION** and **POWER**.

Construction of QUADRATIC EQUATIONS.
See the article **CONSTRUCTION**.

QUADRATING of a piece, among gunners, is the due placing of a piece of ordnance, and poising it in its carriage, and having its wheels of an equal height, &c. See the article **GUNNERY**.

QUADRATO-CUBUS, **QUADRATO-QUADRATO-CUBUS**, and **QUADRATO-CUBO-CUBUS**, according to Diophantus, Vieta, Oughtred, &c. denotes the fifth, seventh, and eighth powers. See the article **POWER**.

QUADRATO-QUADRATUM, or **BIQUADRATUM**, the fourth power of numbers, or the product of the cube when multiplied by the root.

QUADRATRIX, in geometry, a mechanical line, by means whereof we can find right lines equal to the circumference of circles, or other curves, and their several parts.

QUADRATRIX of Dinostrates, so called from its inventor Dinostrates, is a curve, whereby the quadrature of the circle is effected mechanically.

QUADRATRIX Tschirnhausiana, is a transcendental curve invented by M. Tschirnhausen, whereby the quadrature of the circle is likewise effected.

QUADRATUM-CUBI, **QUADRATO-QUADRATO-QUADRATUM**, and **QUADRATUM-SURDESOLIDI**, according to the Arabs, denote the sixth, eighth, and tenth powers of numbers. See **POWER**.

QUADRATURE, **QUADRATURA**, in

geometry, denotes the squaring, or reducing a figure to a square. Thus, the finding of a square, which shall contain just as much surface or area, as a circle, an ellipsis, a triangle, &c. is the quadrature of a circle, ellipsis, &c.

The quadrature of rectilinear figures, or method of finding their areas, has been delivered under their several articles **TRIANGLE**, **PARALLELOGRAM**, **TRAPEZIUM**, **POLYGON**, &c.

But the quadrature of curvilinear spaces, as the circle, ellipsis, parabola, &c. is a matter of much deeper speculation, making a part of the higher geometry; wherein the doctrine of fluxions is of singular use. See **FLUXION**.

Case I. Let ARC (plate CCXXIV. fig. 2. n^o 1.) be a curve of any kind, whose ordinates Rb , CB , are perpendicular to the axis AB . Imagine a right line bRg , perpendicular to AB , to move parallel to itself from A towards B ; and let the velocity thereof, or the fluxion of the absciss Ab , in any proposed position of that line, be denoted by bd , then will bn , the rectangle under bd and the ordinate bR , express the corresponding fluxion of the generating area AbR ; which fluxion, if $Ab = x$, and $bR = y$, will be yx . From whence, by substituting for y or x , according to the equation of the curve, and taking the fluent, the area itself AbR will become known.

But in order to render this still more plain, we shall give some examples, wherein x , y , z , and u are all along put to denote the absciss, ordinate, curve-line, and the area respectively, unless where the contrary is expressly specified. Thus, if the area of a right angled triangle be required; put the base AH (ib. n^o 2.) $= a$, the perpendicular $HM = b$, and let $AB = x$, be any portion of the base, considered as a flowing quantity; and let $BR = y$, be the ordinate, or perpendicular corresponding. Then because of the similar triangles AHM and ABR , we shall have $a : b :: x : y = \frac{bx}{a}$.

Whence, yx , the fluxion of the area ABR , is, in this case, equal to $\frac{bx^2}{a}$; and consequently the fluent thereof, or the area itself, $= \frac{bx^2}{2a}$: which, therefore, when $x = a$, and BR coincides with HM , will become $\frac{ab}{2} = \frac{AH \times HM}{2}$ the area

of the whole triangle A H M; as is also demonstrable from the principles of common geometry. See TRIANGLE.

Again, let the curve A R M H (*ibid.* n^o 3.) whose area you would find, be the common parabola; in which case, if A B = x, and B R = y, and the parameter = a; we shall have $y^2 = ax$, and $y = a^{\frac{1}{2}} x^{\frac{1}{2}}$; and therefore $u (= y \dot{x}) = a^{\frac{1}{2}} x^{\frac{1}{2}} \dot{x}$; whence $u = \frac{2}{3} \times a^{\frac{1}{2}} x^{\frac{3}{2}} = \frac{2}{3} a^{\frac{1}{2}} x^{\frac{3}{2}}$ $\times x = \frac{2}{3} y x = \frac{2}{3} \times A B \times B R$. Hence a parabola is two-thirds of a rectangle of the same base and altitude.

The same conclusion might have been found more easily in terms of y: for $x = \frac{y^2}{a}$, and $\dot{x} = \frac{2yy}{a}$; and consequently $u (= y \dot{x}) = \frac{2y^2 \dot{y}}{a}$; whence $u = \frac{2y^3}{3a} = \frac{2y}{3} \times \frac{y^2}{a} = \frac{2y}{3} \times x = \frac{2}{3} \times A B \times B R$, as before.

To determine the area of the hyperbolic curve A M R B (*ibid.* n^o 4.) whose equation is $x^m y^n = a^{m+n}$; whence we have

$$y = \frac{a^{\frac{m+n}{n}}}{x^{\frac{m+n}{n}}} = a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}; \text{ and there-}$$

$$\text{fore } u (= y \dot{x}) = a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}} \dot{x},$$

$$\text{whose fluent is } u = \frac{a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{1 - \frac{m+n}{n}} =$$

$$\frac{na^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{n - m};$$

which, when $x = 0$, will also be $= 0$, if n be greater than m ; therefore the fluent requires no correction in this case; the area A M R B, included between the asymptote A M, and the ordinate B R, being truly defined by

$$\frac{na^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{n - m}, \text{ as above. But if } n \text{ be}$$

less than m , then the fluent, when $x = 0$, will be infinite, because the index $\frac{n-m}{n}$ being negative, 0 becomes a divisor to $na^{\frac{m+n}{n}}$; whence the area A M R B will also be infinite.

But here, the area B R H, comprehended between the ordinate, the curve,

and the part B H, of the asymptote, is finite, and will be truly expressed by

$$\frac{na^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{m - n}, \text{ the same quantity with}$$

its signs changed: for the fluxion of the

$$\text{part A M R B being } a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}} \dot{x},$$

that of its supplement B R H must con-

$$\text{sequently be } -a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}} \dot{x}, \text{ where-}$$

$$\text{of the fluent is } -\frac{a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{1 - \frac{m+n}{n}} =$$

$$\frac{a^{\frac{m+n}{n}} \times x^{-\frac{m+n}{n}}}{m - n} = \text{the area B R H, which}$$

wants no correction; because when x is infinite, and the area B R H = 0, the said fluent will also entirely vanish;

$$\text{since the value of } x^{\frac{m-n}{n}}, \text{ which is a di-}$$

$$\text{visor to } a^{\frac{m+n}{n}}, \text{ is then infinite.}$$

Case II. Let A R M (*ibid.* n^o 5.) be any curve, whose ordinates C R, C R, are all referred to a point or center; conceive a right line C R H, to revolve about the given center C, and let a point R, move along the said line, so as to trace out or describe the proposed curve A R M. Now it is evident, that, if the point R was to move from any position Q, without changing its direction and velocity, it would proceed along the tangent Q S, instead of the curve, and describe areas Q S C, Q S C, about the center C, proportional to the times of their description; because those areas or triangles, having the same altitude, C P, are as the bases Q S and Q S; and these are as the times because the motion in the tangent, upon that supposition, would be uniform.

Hence, if R S be taken to denote the value of z , the fluxion of the curve line A R, the corresponding fluxion of the area A R C, will be truly represented by the uniformly generated triangle Q C S. And putting the perpendicular C P, drawn from the center to the tangent, equal to s , we shall have $\frac{s \dot{z}}{2} (= \frac{Q S \times C P}{2})$; for the fluxion of the area, from whence the area itself may be found.

But

But since, in many cases, the value of z cannot be computed (from the property of the curve) without considerable trouble, the two following expressions, for the fluxion of the area, will commonly be

found more commodious, *viz.* $\frac{y y}{2 t}$ and $\frac{y^2 \dot{x}}{2 a}$; where $t = R P$, and $x =$ the arch

$B N$ of a circle, described about the center C , at any distance $a (= C B)$. These expressions are derived from that above, in the following manner, *viz.* $z : y :: y$

$(C R) : t (R P)$; therefore $z = \frac{y y}{t}$; and consequently $\frac{z \dot{z}}{2} = \frac{y y \dot{y}}{2 t}$, which is the first

expression. Again, because the velocity of R , in the direction of the tangent, is denoted by z , that in a direction perpendicular to $C Q$ (whereby the point R revolves about the center C) will be $(=$

$\frac{C P}{C R} \times z) = \frac{z}{y}$; which being to \dot{x} , the

velocity of the point N , about the same center, as the distance or radius $C R (y)$

to the radius $C N (a)$ we have $\frac{a \dot{z}}{y} = y \dot{x}$; and consequently, $\frac{z \dot{z}}{2} = \frac{y^2 \dot{x}}{2 a}$, which is the other expression.

In order to illustrate this case, let it be required to determine the area of the circular sector $A O R$ (*ibid.* n° 6.) for putting the radius $A O$ (or $O R$) $= a$, the arch $A R$ (considered as variable by the motion of R) $= x$, and $R r = z$: the fluxion of the area will here be expressed

by $\frac{a z}{2}$ ($=$ the triangle $O R r$): whence the area itself is $= \frac{a x}{2} = A O \times \frac{1}{2} A R$; so

that it appears, that the area of any circle is expressed by a rectangle under half the circumference, and half the diameter. See the article RECTIFICATION.

Again, suppose it were required to find the area of a semi-circle $A R E H$ (*ibid.* n° 7.) Put the diameter $A H = a$, $A B = x$, and $B R = y$, $\&c.$ as usual, and we have $y^2 = a x - x x$; and consequent-

ly $\dot{y} (= y \dot{x}) = x \sqrt{a x - x x} = a^{\frac{1}{2}} x^{\frac{1}{2}} \dot{x}$

$1 - \frac{x^2}{a}$. But as this expression does not admit of a fluent in finite terms, it must be resolved into an infinite series, *viz.*

$$\dot{y} = a^{\frac{1}{2}} x^{\frac{1}{2}} \dot{x} \times 1 - \frac{x}{2a} - \frac{x^2}{8a^2} - \frac{x^3}{16a^3} - \frac{5x^4}{128a^4}$$

$$\&c. = a^{\frac{1}{2}} \times x^{\frac{1}{2}} \dot{x} - \frac{x^{\frac{3}{2}} \dot{x}}{2a} - \frac{x^{\frac{5}{2}} \dot{x}}{8a^2} - \frac{x^{\frac{7}{2}} \dot{x}}{16a^3}$$

$\&c.$ From whence the fluent of every term being taken, according to the common method, there will come out $u =$

$$a^{\frac{1}{2}} \times 2x^{\frac{3}{2}} - \frac{x^{\frac{5}{2}}}{5a} - \frac{x^{\frac{7}{2}}}{28a^2} - \frac{x^{\frac{9}{2}}}{72a^3} - \frac{5x^{\frac{11}{2}}}{704a^4}$$

$$\&c. = x \sqrt{a x} \times \frac{2}{3} - \frac{x}{5a} - \frac{x^2}{28a^2} - \frac{x^3}{72a^3} - \frac{5x^4}{704a^4}, \&c. = \text{the area } ABR. \text{ Now}$$

when $x = \frac{1}{2} a$, the ordinate $B R$, will coincide with the radius $O E$; in which case, the area becomes $= \frac{1}{2} a \sqrt{\frac{1}{2} a} \times$

$$\frac{2}{3} - \frac{1}{5} - \frac{1}{112} - \frac{1}{576} - \frac{5}{11264}, \&c. = \frac{a^2 \sqrt{\frac{1}{2}}}{2} \times 0.6666 - 0.1 - 0.0089 - 0.0017$$

$- 0.0004, \&c. = 0.1964 a^2$; which multiplied by 2, gives $0.3928 a^2$, for the area of the semi-circle $A E H$, nearly.

As the foregoing series converges but slowly, it may be of use to try, whether, by computing the area of a lesser portion ABR , that of the whole may not be obtained more quickly; and where x being small in comparison of a , the series may have such a rate of convergency, that a small number of terms will be sufficient. Now, in order to this, it is well known that, if the arch $A R$, be taken $= \frac{1}{2} A E$, or 30° , the sine $B R$ will be $\frac{1}{2} A O$; and consequently $A B (= x) = A O -$

$O B = A O - \sqrt{O R^2 - B R^2}$, which, if the radius $A O = 1$, will be 0.1339746 , very nearly. This, therefore, will be the value of a , being substituted in the fore-mentioned series, *viz.* $\sqrt{a x^3} \times$

$$\frac{2}{3} - \frac{x}{5a} - \frac{x^2}{28a^2}, \&c. \text{ we have } 0.0693505 \times 0.6666666 = 0.0133975 - 0.0001603$$

$- 0.0000042, \&c. = 0.0693505 \times 0.6531046 = 0.0452931 = \text{the area } ABR$; which, added to the area $O B R (= O B$

$\times \frac{1}{2} B R = \sqrt{\frac{3}{4}} \times \frac{1}{4} = 0.2165063$) gives 0.2617994 , for the area of the sector $A O R$, the treble whereof 0.7853982 (because $A R = \frac{1}{3} A E$) will therefore be the area of the whole quadrant $A O E$; and this number, found by taking only four terms of the series, is true to the last decimal place.

If it were required to find the area of the

loga-

logarithmic spiral CBAC (*ibid.* n° 8.) let the right line AT, touch the curve in A; upon which, from the center C, let fall the perpendicular CT. Then, since by the nature of the curve, the angle TAC is every where the same; the ratio of AT (*t*) to CT (*s*) will here be constant; and therefore the fluent of $\frac{s}{t} \times \frac{yy}{2} = \frac{s}{t} \times \frac{y^2}{4}$ = the area of CBAC.

Again, to find the area CRRC (*ibid.* n° 9.) of the spiral of Archimedes, CRRR; let AC be a tangent to the curve at the center C, about which center, with the radius AC (= *a*) suppose a circle Agg, to be described; then the arch (or absciss) Ag, corresponding to any proposed ordinate CR, being to that ordinate in a given or constant ratio (suppose as *m* to *n*) we have $x (= Ag) = \frac{my}{n}$; therefore $u = \frac{y^2 x}{2a} = \frac{my^2 y}{2an}$; and

consequently $u = \frac{my^3}{6an}$ = the area CRRC.

Lastly, let the curve proposed be the ellipsis AEB (*ibid.* n° 10.) whose area is required; in order to find which, put the transverse axis AB = *a*, and the conjugate axis (2 CE) = *c*, and we shall have (by the property of the curve) $y (= DR) = \frac{c}{a} \sqrt{ax - xx}$; and consequently $u (=$

$yx) = \frac{c}{a} x \sqrt{ax - xx}$ = the fluxion of the area ARD. But $x \sqrt{ax - xx}$ is known to express the fluxion of the corresponding segment ADn, of the circumscribing semi circle, whose fluent is therefore given, or may be found by the method of quadrating the circle above delivered. Let this fluent be denoted by A, and that of $\frac{c}{a} x \sqrt{ax - xx}$ will

consequently be $= \frac{c}{a} \times A$. Hence, the

area of the segment of an ellipsis is to the area of the corresponding segment of its circumscribing circle, as the lesser axis of the ellipsis is to the greater; whence it follows, that the whole ellipsis must be to the whole circle in the same ratio.

QUADRATURE, in astronomy, that aspect of the moon when she is 90° distant from the sun; or when she is in a middle point of her orbit, between the points of conjunction and opposition, namely, in the first and third quarters. See MOON.

QUADRATURE-LINES. are two lines placed on Gunter's sector: they are marked with

Q. and 5, 6, 7, 8, 9, 10: of which Q. signifies the side of the square, and the other figures the sides of polygons of 5, 6, 7, &c. sides. S, on the same instrument, stands for the semi-diameter of a circle, and 90 for a line equal to 90° in circumference.

QUADRATUS, in anatomy, a name given to several muscles on account of their square figure; as, 1. The quadratus femoris, or of the thigh, which has its origin from the tubercle of the ischium, and its termination at an eminence between the two trochanters. 2. The quadratus lumborum, or of the loins, which has its origin in the anterior and superior part of the posterior process of the os ilei, and its end at the transverse apophyses of the vertebræ of the loins, the last vertebra of the thorax, and the last rib. 3. The quadratus of the radius, which has its origin in the lower part of the ulna, and its termination opposite to the lower part of the radius.

QUADREL, in building, a kind of artificial stone, so called from its being perfectly square.

The quadrels are made of chalky earth, &c. and dried in the shade for two years. These were formerly in great request among the Italian architects.

QUADRIGA, in antiquity, a car or chariot drawn by four horses.

On the reverses of medals, we frequently see the emperor or victory in a quadriga, holding the reins of the horses; whence these coins are, among the curious, called nummi quadrigati, and victoriati.

QUADRILATERAL, in geometry, a figure whose perimeter consists of four right lines, making four angles; whence it is also called a quadrangular figure. The quadrilateral figures are either a parallelogram, trapezium, rectangle, square, rhombus, or rhomboides. See TRAPEZIUM, RECTANGLE, &c.

QUADRILL, *quadrilla*, a little troop or company of cavaliers, pompously dressed, and mounted for the performance of carousals, jousts, tournaments, runnings at the ring, and other gallant divertisements.

A regular carousal is said to have at least four, and at most twelve quadrills. Of these quadrills each is to consist of at least three cavaliers, and at most of twelve. The quadrills are distinguished by the forms of their habits, or the diversity of their colours.

QUADRILLE is also a game at cards, sometimes called ombre by four; which chiefly differs from ombre by three, in being

being played by four persons, and having all the forty cards dealt out, to each person, at ten each. See OMBRE.

The general laws of this game are, 1. It is not permitted to deal the cards any otherwise than four by three, the dealer being at liberty to begin with which of those numbers he pleases. 2. If he who plays either *sans prendre*, or calling a king, names a trump of a different suit from that his game is in, or names two several suits, that which he first named must be the trump. 3. He who plays must name the trump by its proper name, as he likewise must the king he calls. 4. He who has said *I pass*, must not be again admitted to play, except he plays by force, upon account of his having *spadille*. 5. He who has asked the question, and has leave given him to play, is obliged to do it; but he must not play *sans prendre* except he is forced to do it. 6. He who has the four kings may call the queen of either of his kings. 7. Neither the king nor queen of the suit which is trumps, must be called. 8. He who has one, or several kings, may call any king he has in his hand; in such case, if he wins, he alone must make six tricks: if he wins it is all his own, and if he loses he pays all by himself. 9. Every one ought to play in his turn, but for having done otherwise no one must be beasted. 10. He, however, whose turn it is not to play, having in his hand the king the ombre has called, and shall trump about with either *spadille*, *manille*, or *ballo*, or shall even play down the king that was called, to give notice of his being the friend, must not pretend to undertake the vole; nay he must be condemned to be beasted if it appears that he did it with any fraudulent design. 11. He who has drawn a card from his game, and presented it openly in order to play it, is obliged so to do, if his retaining it may be either prejudicial to the game or give any intimation to the friend, especially if the card is a *matadore*: but he who plays *sans prendre*, or calls his own king, is not subject to this law. 12. None ought to look upon the tricks, nor to count aloud what has been played, except when it is his turn to play, but to let every one reckon for himself. 13. He who instead of turning up the tricks before any one of his players, shall turn up and discover his game, must be equally beasted with him whose cards he had so discovered, the one pay-

ing one half and the other the like. 14. He who renounces must be beasted as many times as he has so done; but if the cards are mixed he is to pay but one beast. 15. If the renounce prejudices the game, and the deal is not played out, every one may take up his cards, beginning, at the trick where the renounce was made, and play them over again. 16. He who shews the game before the deal is out must be beasted, except he play *sans prendre*. 17. None of the three *matadores* can be commanded down by an inferior trump. 18. If he who plays *sans prendre* with the *matadores* in his hand, demands only one of them, he must receive only that he mentioned. 19. He who instead of *sans prendre* shall demand *matadores*, not having them; or he who shall demand *sans prendre* instead of *matadores*, cannot compel the players to pay him what is really his due. 20. *Matadores* are only paid when they are in the hands of the ombre, or of the king his ally, whether all in one hand or separately in both. 21. He who undertakes the vole and does not make it, must pay as much as he would have received had he won it. 22. He who plays and does not make three tricks is to be beasted alone, and must pay all that is to be paid; and if he makes no tricks at all, he must also pay to his two adversaries the vole, but not to his friend.

QUADRUPEDS, *quadrupedia*, in zoology, a class of land animals, with hairy bodies, and four limbs or legs proceeding from the trunk of their bodies: add to this, that the females of this class are viviparous, or bring forth their young alive, and nourish them with milk from their teats.

This class, though still numerous enough, will be considerably lessened in number, by throwing out of it the frog, lizard, and other four-footed amphibious animals. See the article AMPHIBIOUS.

On the other hand, it will be increased by the admission of the bat; which, from its having the fore-foot webbed with a membrane, and using them as birds do their wings in flying, has erroneously been ranked among the bird-kind. See the article BIRD.

Linnaeus, whose history of zoology we have generally followed, subdivides the quadruped-class into six orders, which he characterizes from the number, figure, and disposition of their teeth; the first order he calls *anthropomorpha*, from their resemblance

semblance to the human shape: these have four fore-teeth in each jaw, as represented in plate CCXXV. fig. 1. n^o 1. The feræ, or beasts of prey, make the second order, and are distinguished by having six sharp pointed fore-teeth in each jaw, and very long canine teeth, *ibid.* n^o 2. The third order, denominated agriæ, is sufficiently distinguished by having no teeth at all, *ibid.* n^o 3. The glires make the fourth class, and are distinguished by having the fore-teeth only two in number, and those prominent: *ibid.* n^o 4. The pecora constitute the fifth order, and have no fore-teeth at all in the upper-jaw, and the fore-teeth in the lower-jaw are six: *ibid.* n^o 5. The sixth and last order is that of the jumenta, the teeth of which are few in number, and disposed in an irregular manner, quite different from that of any of the five preceding orders: *ibid.* n^o 6. See the article ANTHROPOMORPHA, &c.

QUADRUPLATORES, among the Romans, were informers, who had the fourth-part of the confiscated goods for their pains.

QUADRUPLE, a sum or number multiplied by four or taken four times.

This word is particularly used for a gold-coin worth four times as much as that whereof it is the quadruple.

QUÆ EST EADEM, in law, words used in pleadings, to supply the want of traverse; as where a defendant justifies a trespass or an assault at another day or place than is specified in the plaintiff's declaration, he ought to say, *quæ est eadem transgressio*, &c.

QUÆ PLURA, in law, was formerly a writ that lay where an inquisition had been taken by an escheator, of such lands, &c. whereof a person died seised, and it was supposed that all the lands were not found by the inquisition.

QUÆ SERVITIA, a writ relating to services, &c.

QUÆRE, in law, is where any point is doubted of.

QUESTUS, in law, signifies whatever a person has by purchase; as hereditas denotes that which one has by descent, or hereditary right. See PURCHASE.

QUAIL, *coturnix*. See COTURNIX.

Quails, on being imported, pay a duty of 1 s. 6 $\frac{4}{10}$ d. the dozen; and draw back, on exportation, 1 s. 4 $\frac{2}{10}$ d.

QUAKERS, a religious sect which made its first appearance in England during the interregnum; so called, in derision, from

certain unusual tremblings with which they were seized at their first meetings. Their founder was George Fox, a shoemaker, born at Draiton, in Leicestershire; who, as he worked at his trade, used to meditate much on the Scriptures: at length he began to see visions, and set up for a preacher. He proposed but few articles of faith, insisting chiefly on moral virtue, mutual charity, the love of God, and a deep attention to the inward motions and secret operations of the spirit. He required a plain simple worship, and a religion without ceremonies, making it a principal point to wait in profound silence the directions of the Holy Spirit.

Quakers were at first guilty of some extravagancies, but these wore off, and they settled into a regular body, professing great austerity of behaviour, a singular probity and uprightness in their dealings, a great frugality at their tables, and a remarkable plainness and simplicity in their dress.

The system of the quakers is laid down in fifteen theses, by Robert Barclay, in a sensible, well wrote apology, addressed to Charles II. Their principal doctrines are, That God has given to all men, without exception, supernatural light, which being obeyed can save them; and that this light is Christ, the true light, which lighteth every man that cometh into the world: that the Scriptures were indeed given by inspiration, and are preferable to all the other writings in the world; but that they are no more than secondary rules of faith and practice, in subordination to the light or spirit of God, which is the primary rule: that immediate revelation is not ceased, a measure of the spirit being given to every one: that all superstitions and ceremonies in religion of mere human institution, ought to be laid aside; as also, in civil society, the saluting one another by pulling off the hat, bowing, or the like; and the saying *you* instead of *thou*, to a single person: that men and women ought to be plain and grave in their apparel, sober and just in their whole conversation, and, at a word, in all their dealings; and not to swear, to go to war, to fight in private quarrels, or even to bear any carnal weapons. They also entirely set aside the two sacraments, baptism and the lord's supper; admit no clergy among them, but any one, without distinction, who is of a sober life, and

Fig. 1. QUADRUPEDS

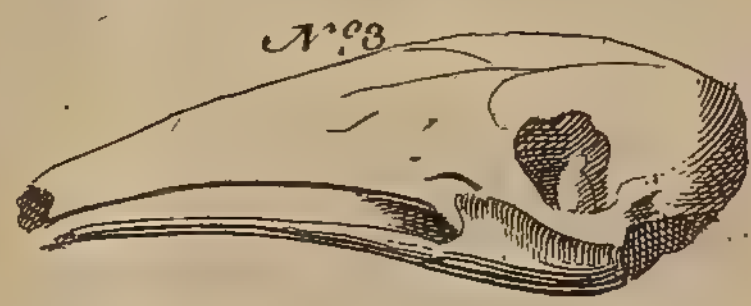
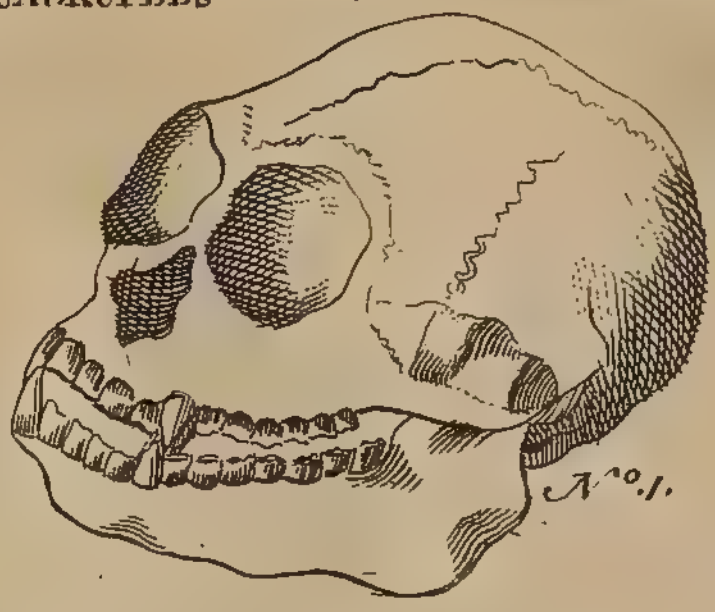


Fig. 3. QUINCUNX

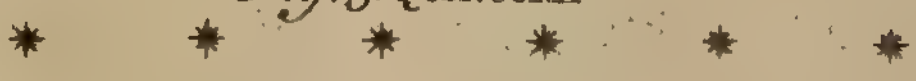


Fig 2. QUARTERING

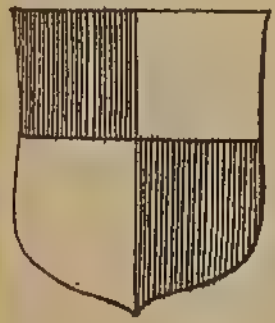


Fig. 4. PYROLA, WINTER-GREEN





and believes him or herself to be moved thereto by the spirit, is allowed to preach in their assemblies; and they hold it unlawful to pay tythes, or church-rates. In short, they are a quiet inoffensive people, of exemplary morals, remarkably charitable and friendly to each other, and have never yet been guilty of persecution, though they have had it in their power.

As to discipline and polity, the affairs of the community are managed in their assemblies, of which there are several kinds; as monthly, quarterly, yearly, second days meetings, and meetings of sufferings. The monthly and quarterly meetings are held in their respective counties, to which deputies are sent from the several particular meetings, and enquiry is made into the state of each meeting; who violate the laws of the community; who pay tythes or church-rates, and who suffer for the non-payment of either: here too they excommunicate and receive again into their communion. Of all which registers are kept.

From these meetings appeals lie to their yearly assemblies, which are always held in London, and consist of three orders or classes; representatives sent from the quarterly meetings, correspondents from foreign countries and the several counties, and preachers. Hither are transmitted accounts of what has been transacted in all the monthly and quarterly meetings: here measures are concerted, and directions given as to behaviour about tythes, rates, &c. and here they compose differences and make provision for the poor: Here public accounts are audited, and instructions given to the deputies to be observed at their return; and from hence a yearly epistle of admonition is dispatched to be read in all the monthly and quarterly meetings.

The second day's meeting is a standing committee, consisting of the principal preachers in and about the city, who meet every monday to consider of particular cases and exigencies which happen between the yearly meetings.

The meeting of sufferings is held every week, and consists of the correspondents for each county. Its business is to receive complaints for such as have suffered for non-payment of tythes and church-rates, and to procure them relief, either by sending them money, for which they have a settled fund, or by soliciting their cause, or both.

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QUALE jus, in law, a judicial writ which was antiently brought, where a religious person had judgment to recover land before execution was made of the judgment; in which case, it went out to the escheator in order to inquire, whether the person had right to recover, or whether the judgment was obtained by collusion between the demandant and the tenant, with an intention to defraud the lord, &c.

QUALIFICATOR, in the canon-law, a divine appointed to qualify, or declare the quality of a proposition brought before an ecclesiastical tribunal, chiefly before the inquisition. The qualificators of the office are not judges, they only give their sentiments on the proposition presented to them.

QUALIFIED, in law, a person enabled to hold two livings or benefices.

QUALITY, *qualitas*, is defined by Mr. Locke, to be the power in a subject of producing any idea in the mind: thus a snow-ball having the power to produce in us the ideas of white, cold, and round, these powers, as they are in the snow-ball, he calls qualities; and as they are sensations, or perceptions, in our understandings, he calls ideas. See **IDEA**.

These qualities, according to the same philosopher are of two sorts; first, original or primary qualities, are those inseparable from body, and such as it keeps in all its changes and situations: these are solidity, extension, motion or rest, number and figure: thus, take a grain of wheat, divide it into two parts, each has solidity, extension, figure, mobility; divide it again and it still retains the same qualities, and will do so still, though you divide it on till the parts become insensible. Secondly, secondary qualities are such, whatever reality we by mistake may attribute to them, as in truth are nothing in the objects themselves, but powers to produce various sensations in us, and depend on the qualities before-mentioned; such are colours, smells, tastes, sounds, &c.

The ideas of primary qualities of bodies, are resemblances of them, and their patterns really exist in bodies; but the ideas produced in us by secondary qualities have no resemblance of them at all: and what is sweet, blue, or warm, in the idea, is but the certain bulk, figure and motion of the insensible parts in the bodies themselves which we call so: thus we see that fire at one distance produces in us the sensation of warmth,

warmth, which at a nearer approach causes the sensation of pain. Now what reason have we to say that the idea of warmth is actually in the fire, but that of pain not in the fire, which the same fire produces in us the same way. The bulk, number, figure, and motion of the parts are really in it, whether we perceive them or no, and therefore may be called real qualities, because they really exist in that body; but light and heat are no more really in it than pain or sickness: take away the sensation of them; let not the eyes see light or colours, nor the ear hear sounds, let the palate not taste, nor the nose smell, and all colours, tastes, odours, and sounds, as they are such particular ideas, vanish and cease, and are reduced to their causes, *i. e.* bulk, motion, figure, &c. of parts.

These secondary qualities are of two sorts; first, immediately perceivable, which by immediately acting on our bodies, produce several different ideas in us. Secondly, mediately perceivable, which, by operating on other bodies, change their primary qualities so as to render them capable of producing ideas in us, different from what they did before. These last are powers in bodies, which proceed from the particular constitutions of those primary and original qualities, to make such a change in the bulk, figure texture, &c. of another body, as to make it operate on our senses differently from what it did before; as in fire, to make lead fluid: these two last being nothing but powers relating to other bodies, and resulting from the different modifications of the original qualities, are yet otherwise thought of; the former being esteemed real qualities, but the latter barely powers. The reason of this mistake seems to be this, that our ideas of sensible qualities, containing nothing in them of bulk, figure, &c. we cannot think them the effect of those primary qualities, which appear not to our senses to operate in their productions, and with which they have not any apparent congruity; nor can reason shew how bodies, by their bulk, figure, &c. should produce in the mind the ideas of warm, yellow, &c. but in the other case, when bodies operate upon one another, we plainly see that the quality produced hath commonly no resemblance with aught in the thing producing it, and therefore we look upon it as the effect of power: but our senses not being able to discover any unlikeness between

the idea produced in us, and the quality of the object producing it, we imagine that our ideas are resemblances of something in the objects, and not the effects of certain powers placed in the modification of the primary qualities, with which primary qualities the ideas produced in us have no resemblance.

Secondary qualities, for the most part, serve to distinguish substances; for our senses fail us in the discovery of the bulk, figure, texture, &c. of the minute parts of bodies, on which their real constitutions and differences depend: and secondary qualities are nothing but powers with relation to our senses. The ideas that make our complex ones, of corporeal substances are of three sorts: first, the ideas of primary qualities of things, which are discovered by our senses: such are bulk, figure, motion, &c. secondly, the sensible secondary qualities, which are nothing but powers to produce several ideas in us, by our senses; thirdly, the aptness we consider in any substance, to cause or receive such alterations of primary qualities, as that the substance, so altered, should produce in us different ideas from what it did before: and they are called active or passive powers. The mind can have no other idea of sensible qualities, than what comes from without, by the senses; nor any other idea of the operations of a thinking substance, than what it finds in itself; and as of two primary qualities of body, *viz.* solid coherent parts, and impulse, we have clear and distinct ideas, so likewise have we of two primary qualities of spirit, *viz.* thinking, and a power of action: and as we have clear and distinct ideas of several qualities inherent in bodies, which are but the various modifications of the extension of cohering solid parts, and their motion; so we have likewise the ideas of the several modes of thinking, *viz.* believing, doubting, hoping, fearing, &c.

Chemical QUALITIES, those qualities principally introduced by means of chemical experiments, as fumigation, amalgamation, capellation, volatilization, precipitation, &c.

To these chemical qualities some others might be added, which, because of the use which physicians principally make of them, may be called medical qualities; whereby some substances, received into the human body, are resolving, dissolving, absterfive, &c.

QUALITY is also used for a kind of title given to certain persons, in regard of their

their territories, signories, or other pretensions.

QUAM DIU SE BENE GESSERIT, a clause frequently to be found in letters patent of the grant of offices, as in those to the barons of the exchequer, &c. where it intimates that they shall hold the same as long as they shall behave themselves well. It is said, that these words intend what the law would imply, if an office were granted during life.

QUAMSI, a province of China, bounded by the province of Yunan on the west, by Queycheu on the north, by Quantum on the east, and by Tonquin on the south.

QUAMTUM, or **CANTON**, a province of China, bounded by Huguam and Kiamsi on the north, by Foken on the east, by the ocean on the south, and by Quamsi on the west.

QUANTITY, *quantitas*, any thing capable of estimation, or mensuration; or which, being compared with another thing of the same kind, may be said to be greater or less than it, equal or unequal to it.

Mathematics is the science or doctrine of quantity, which being made up of parts, is capable of being made greater or less. It is increased by addition, and diminished by subtraction; which are therefore the two primary operations that relate to quantity. Hence it is that any quantity may be supposed to enter into algebraic computations two different ways, which have contrary effects, *viz.* either as an increment or as a decrement. See the articles **ADDITION** and **SUBTRACTION**.

As addition and subtraction are opposite, or an increment is opposite to a decrement, there is an analogous opposition between the affections of quantities that are considered in the mathematical sciences; as between excess and defect, between the value of effects or money due to a man, and money due by him; a line drawn towards the right, and a line drawn towards the left; gravity, and levity; elevation above the horizon, and depression below it. When two quantities equal in respect of magnitude, but of those opposite kinds, are joined together, and conceived to take place in the same subject, they destroy each other's effect, and their amount is nothing. A power is sustained by an equal power, acting on the same body with a contrary direction, and neither have effect. When two unequal quantities of those opposite qualities are joined in the same subject, the greater

prevails by their difference; and when a greater quantity is taken from a lesser of the same kind, the remainder becomes of the opposite kind. When two powers or forces are to be added together, their sum acts upon the body; but when we are to subtract one of them from the other, we conceive that which is to be subtracted, to be a power with an opposite direction; and if it be greater than the other, it will prevail by the difference. This change of quality only takes place where the quantity is of such a nature as to admit of such a contrariety or opposition. We know nothing analogous to it in quantity abstractly considered, and cannot subtract a greater quantity of matter from a lesser, or a greater quantity of light from a lesser; and the application of this doctrine to any art or science, is to be derived from the known principles of the science. See the articles **ALGEBRA**, **GEOMETRY**, &c.

A quantity that is to be added, is called a positive quantity; and a quantity to be subtracted, is said to be negative. See **POSITIVE** and **NEGATIVE**.

Quantities are said to be like or similar, that are of the same denomination, or are represented by the same letter or letters, equally repeated: but quantities of different denominations, or represented by a different letter or letters, are said to be unlike or dissimilar. A quantity consisting of more than one term is called a compound quantity; whereas that consisting of one term only is denominated a simple quantity.

The quantity of matter in any body, is the product of its density into its bulk; or a quantity arising from the joint consideration of its magnitude and density; as if a body be twice as dense, and take up twice as much space as another, it will be four times as great. This quantity of matter is best discoverable by the absolute weight of bodies. See **GRAVITY**. The quantity of motion in any body is the factum of the velocity into the mass, or it is a measure arising from the joint consideration of the quantity of matter, and the velocity of the motion of the body; the motion of any whole being the sum or aggregate of the motion in all its several parts. Hence, in a body twice as great as another, moved with an equal velocity, the quantity of motion is double; if the velocity be double also, the quantity of motion will be quadruple. Hence, the quantity of motion is the same with what we call the momentum or im-

petus of a moving body. See MOTION.

Combination of QUANTITIES. See the article COMBINATION.

Commensurable QUANTITIES. See the article COMMENSURABLE.

Exponential QUANTITY. See the article EXPONENTIAL.

Infinite QUANTITIES. See INFINITE QUANTITIES and INFINITESIMALS.

Transcendental QUANTITIES. See the article TRANSCENDENTAL.

Variable QUANTITIES. See VARIABLE.

QUANTITY, in grammar, an affection of a syllable, whereby its measure, or the time wherein it is pronounced, is ascertained; or that which determines the syllable to be long or short. See the articles MEASURE and SYLLABLE.

Quantity is also the object of prosody, and distinguishes verse from prose; and the œconomy and arrangement of quantities, that is, the distribution of long and short syllables, make what we call the number. See PROSODY, VERSE, and NUMBER.

The quantities are used to be distinguished, among grammarians, by the characters *o*, short, as *pēr*; and *—*, long, as *rōs*. There is also a common, variable, or dubious quantity; that is, syllables that are one time taken for short ones, and at another time for long ones as the first syllable in *Atlas*, *patres*, &c. Feet are made up of quantities. See FOOT. The quantity of a syllable is either natural or accidental: natural quantity is that taken from the nature of the vowel, as *re* in *resisto* is short, and *de* in *depello*, is long. Accidental quantity is that departing from the natural quantity, merely by accident, as *re* in *resisti* is long, because it is immediately followed by two consonants; and *de* in *deamo* is short, because it immediately precedes a vowel.

The quantity of syllables is known two ways. 1. By rules for that purpose. And, 2. By authority. The rules for this end are taught by that part of grammar called prosody; the authority made use of in this case is no more than examples from, or the testimony of, approved authors; and is never used but either when the rules are deficient, or when we are unacquainted with them. The quantity of the syllables is but little fixed in the modern tongues; and there is still less regard had to it in the composition of modern verses. The want of feet, or rather the shortness and uniformity of our feet, makes a world of difference between the numbers of the antient and modern verse. The antients

subsisted by their quantities alone; so well were they distinguished, and such a harmony did they produce. Our quantities make such poor music, that we are generally forced to call in the gothic aid of rhyme, to distinguish our verse from prose.

QUANTITY of a degree. See DEGREE.

QUANTUM MERUIT, in law, is an action upon the case, founded on the necessity of paying a person, for doing any thing as he deserves.

QUARANTAIN, QUARENTINE, or QUARANTENA, in old law books, denotes the space of forty days. It also signifies a benefit allowed to the widow of a man dying seised of lands, &c. by which she may challenge to continue in his capital messuage, or chief mansion-house, so it be not a castle, for the space of forty days after his decease. And if the heir or any other person eject her, she may have the writ de quarantena habenda.

QUARANTAIN is more particularly used for a term of forty days, which vessels, coming from places suspected of contagion, are obliged to wait in certain places appointed to air themselves, before they come into port. See the article LAZAR-HOUSE.

Quarantain, also signifies a measure or extent of land, containing forty perches.

QUARANTAIN of the king, in France, denotes a truce of forty days appointed by St. Louis, during which it was expressly forbid to take revenge on the relations or friends of people, who had fought, wounded, or affronted each other in words.

QUARE, in law, a term affixed to the title of several writs: as 1. Quare eiecit infra terminum, is a writ that lies for a lessee cast out of his farm before his term is expired. 2. Quare impedit, a writ that lies for a person that has purchased an advowson, against him who disturbs him in the right thereof, by presenting a clerk to it when the church is vacant. This writ differs from what is called a darrein presentment, because that is brought where a person or his ancestors formerly presented; but this lies for him that is purchaser himself. Yet in both these writs, the plaintiff recovers the presentation and damages; though the title to the advowson is recovered only by a quare impedit. 3. Quare incumbravit is a writ that lies against a bishop, who within six months after the vacancy of a benefice, confers it on his clerk, while two others are contesting the right of presentation. 4. Quare non admittit, is a writ that lies where any one has recovered an advowson

son or presentation, and sending his clerk to be admitted, the bishop refuses to admit him: in which case the person that has the presentation may have this writ against the bishop. 5. *Quare non permittit*, is a writ that lies for one who has a right to present for a turn against the proprietary. 6. *Quare obstruxit*, is a writ that lies for him who having a right to pass through another's grounds cannot enjoy the same, by reason the owner has fenced them up.

QUARREL, *querela*, in law, is generally applied to personal and mixed actions, in which the plaintiff is called *querens*: and hence it is that if a person release all quarrels, it is taken to be as beneficial to the releasee, as if it were a release of all actions; since all actions both real and personal are thereby released.

QUARREL of glass. See the next article.

QUARRY, a place under ground, out of which are got marble, free-stone, slate, lime-stone, or other matters proper for buildings.

Quarries of free stone, are in many places opened, and the stone brought out, in the following manner: they first dig a hole in the manner of a well, twelve or fourteen feet in diameter, and the rubbish drawn out with a windlass in large osier baskets, they heap up all around; placing their wheel, which is to draw up their stones, upon it. As the hole advances, and their common ladder becomes too short, they apply a particular ladder for the purpose. When they have got thro' the earth, and are arrived at the first bank or stratum; they begin to apply their wheel and baskets to discharge the stones as fast as they dig through them. In freeing the stone from the bed, they proceed thus: as common stones, at least the softer kinds, have two grains, a cleaving grain, running parallel with the horizon, and a breaking grain, running perpendicular thereto; they observe by the grain where it will cleave, and there drive in a number of wedges, till they have cleft it from the rest of the rock. This done, they proceed to break it; in order to which applying the ruler to it, they strike a line, and by this cut a little channel with their stone-ax; and in the channel if the stone be three or four feet long, set five or six wedges, driving them in very carefully with gentle blows, and still keeping them equally forward. Having thus broken the stone in length, which they are able to do of any size within half an inch, they apply a square

to the strait side, strike a line, and proceed to break it in breadth. This way of managing stone is found vastly preferable to that where they are broken at random: one load of the former being found to do the business of a load and a half of the latter. But it may be observed, that this cleaving grain being generally wanting in the harder kinds of stones, to break up these in the quarries, they have great heavy stone-axes; with which they work down a deep channel into the stone; and into this channel, at the top, lay two iron-bars between which they drive their iron wedges.

QUARRY or QUARREL, among glaziers; a pane of glass cut in a diamond form.

Quarries are of two kinds, square and long, each of which are of different sizes, expressed by the number of the pieces that make a foot of glass, *viz.* eighths, tenths, twelfths, eighteenth, and twentieths: but all the sizes are cut to the same angles, the acute angle in the square quarrels being $77^{\circ} 19'$ and $67^{\circ} 21'$ in the long ones.

QUARRY, among hunters, is sometimes used for a part of the intrails of the beast taken, given by way of reward to the hounds.

QUARRY, in falconry, the game which the hawk is in pursuit of, or has killed.

QUART, a measure containing the fourth part of some other measure. See the article **MEASURE**.

The english quart is the fourth part of a gallon, or two pints. See the articles **GALLON** and **PINT**.

QUARTAN, *quartana*, in medicine, a species of intermitting fever, wherein the patient has two fits in four days, or two days quite free from a fit.

It usually begins about four or five in the afternoon, sometimes sooner and sometimes later, with a great lassitude, stretching, a blunt pain in the head, back, loins, and legs; the feet and hands are cold, and the whole body is pale; and the face and nails livid, to which shivering and shaking supervene. The tongue and the lips tremble, the breathing is difficult, with restlessness, and tossing; the pulse is contracted and hard, and sometimes unequal; and there is an anxiety about the præcordia. These symptoms continue about two or three hours; and in some the body is costive, whereas in others there is a stimulus to stool, and to make water; in some again, there is a nausea or vomiting, with stools; and some advanced in years, have their minds pretty much disturbed. The heat

heat comes on gradually, not burning but dry; the pulse becomes equal, quick, and large, but the dull pain in the head remains, with a vertiginous affection; the skin becomes only a little moist; and in about four or six hours, the symptoms vanish except a dull pain in the bones, joints, and feet. The urine in the fit is sometimes thin and watery, and sometimes thick with a sediment.

From the experiments of Dr. Langrish it appears, that the blood is more dense and tenacious in quotidians than in tertians, and in tertians than in quartans. See QUOTIDIAN and TERTIAN.

As to the cure, a vomit should be given after the first fit, in the time of intermission: in tender constitutions, ipecacuanha may be given alone; or two ounces of vinum ipecacuanhum; but to the more robust, a grain or two of emetic tartar may be added, to be taken in warm water about two hours after the paroxysm. The evacuation should be facilitated by taking large draughts of water-gruel made fat with fresh butter. Then take the following electuary, which will crush the disease in the bud: *viz.* take of rob of elder, one ounce; of peruvian bark, five drams; of the powder of common chamomile-flowers, two drams; of the extract of lesser centaury, and powder of clove-julyflowers, each half a dram; and as much syrup of lemons as is sufficient to reduce them to the form of an electuary. The dose is half a dram, to be taken every two hours after the fit.

If any thing forbids vomiting, the cure must be begun with deterfive and aperient salts, as vitriolated tartar, salt ammoniac, purified nitre; and crab's eyes; and if the ague still continue notwithstanding the repeated use of these salts, then an equal weight of peruvian bark must be added to them, or the above electuary may be given.

When the patient is subject to the hypochondriac passion, the stomach is inflated, and the body costive; then neither vomits nor salts must be ventured upon, but carminative and emollient clysters.

In obstinate quartans, Hoffman greatly commends the following medicine: take of peruvian bark, three drams; of medicinal regulus of antimony, two drams; of mercurius dulcis, which is not to be triturated with the powder, on account of the salts, but only mixed with the point of a knife) of the finest crocus martis, and of vitriolated nitre, each one dram; and of oil of mint, four drops:

make up all these into a powder, of which half a dram, or a dram, may be taken, made into the form of a bolus with rob of elder, and syrup of clove-julyflowers.

This method is confirmed by Huxham, who says the bark frequently proves ineffectual, without the help of proper alexipharmics; as snake-root of Virginia, contrayerva, myrrh, camphor, &c. After four or five paroxysms, warm chalybeates may be added with very great success; but when the patient's complexion has a yellow cast, and he has a tense abdomen, and very costive habit of body, mercurial, saponaceous deobstruents with rhubarb, aloetics, or sal diureticus should be premised to, or joined with the bark. Hoffman observes, that obstinate quartans in boys are not to be cured but by purging; and therefore he directs the following form: take of cream of tartar, one dram; of calyx of antimony, twelve grains, of sulphurated diagrydium, six grains; make them into a powder, which may be taken in three doses, the first six hours before the fit, the second before the next fit, and the third before the third fit. After this, he orders an infusion of half an ounce of peruvian-bark in eight ounces of fennel-water; adding the bark of Eleutherius, sal diureticus, and salt of tartar, of each one dram, together with half an ounce of syrup of clove-julyflowers; a spoonful of which should be taken every two hours.

To prevent the return of an ague, the bark must be repeated every week or ten days, for three several times, with the same intervals. Likewise bitters and chalybeates are very serviceable, taken either together or separately.

QUARTATION, in metallurgy, a method of purifying gold, by melting three parts of silver with one of gold, and then throwing the mixture into aqua-fortis. See the article ASSAYING.

Experience has taught us, says Cramer, that aqua-fortis dissolves silver mixed with gold quickly enough, when the gold constitutes but one, and the silver three parts of a mixed mass of them: and in this case, if the solution is not too impetuously performed, the gold usually remains in such a proportion, in the same figure that the whole mass had before the separation of the silver by this menstruum; so that in this case, there is no reason to apprehend the gold's being torn into minute particles, and dissipated in some measure; though this can hardly be prevented when the silver exceeds the
three

three quarter proportion, in regard to the gold in the mass. The artificers therefore, always make it their study to observe very exactly this proportion of the gold being one fourth part of the mixture; and thence it is that the operation itself has been called quartation.

From this operation we may learn how fallacious the examination made with aqua fortis alone of the gold rubbed on the touchstone, must necessarily prove.

QUARTER, *quadrans*, the fourth part of any thing, the fractional expression for which is $\frac{1}{4}$. See the article **FRACTION**.

Quarter, in weights, is generally used for the fourth part of an hundred weight averdupois, or 28 lb. See **WEIGHT**.

Used as the name of a dry measure, quarter is the fourth part of a ton in weight, or eight bushels. See the articles **MEASURE** and **TUN**.

QUARTER, in law, the fourth part of a year; and hence the days on which these quarters commence, are called quarter-days *viz.* March 25, or Lady-day; June 24, or Midsummer-day; September 29, or Michaelmas; and December 21, or St. Thomas the apostle's day. On these days rents on leases, &c. are usually reserved to be paid; though December 25, or Christmas-day, is commonly reckoned the last quarter-day.

QUARTER, in astronomy, the fourth part of the moon's period: thus, from the new moon to the quadrature is the first quarter; from this to full moon, the second quarter, &c. See the article **PHASES** and **MOON**.

QUARTER, in heraldry, is applied to the parts or members of the first division of a coat that is quartered, or divided into four quarters. See **QUARTERING**.

Franc-QUARTER, in heraldry, is a quarter single or alone; which is to possess one fourth part of the field.

This makes one of the honourable ordinaries of a coat.

QUARTER of a point, in navigation, is the fourth part of the distance between two cardinal points, which $2^{\circ} 48'$.

QUARTER of a ship is that part of a ship's hold, which lies between the steerage-room and the transom.

Close QUARTERS, in a ship, those places where the seamen quarter themselves, in case of boarding, for their own defence, and for clearing the decks, &c.

QUARTER-DECK. See **DECK**.

QUARTER-MASTERS, or **QUARTEERS**, in a man of war, are officers whose business it is to rummage, stow, and trim

the ship in the hold; to overlook the steward in his delivery of victuals to the cook, and in pumping or drawing out beer, or the like. They are also to keep their watch duly, in conning the ship, or any other duty.

QUARTER is also used for a division of a city, consisting of several ranges of buildings, &c. separated from some other quarter by a river, great street, &c.

Such are the twenty quarters of the city of Paris.

Franchise of QUARTERS. See the article **FRANCHISE**.

QUARTER, in war, is used in various senses, as for the place allotted to a body of troops to encamp upon: thus they say, the general has extended his quarters a great way, &c. Quarter also signifies the sparing men's lives: thus it is said, the enemy asked quarter; we gave no quarter.

QUARTER of an assembly, is the place of rendezvous, where the troops are to meet, and draw up in a body.

Head QUARTERS, is the place where the general of an army has his quarters, which is generally near the center of the army.

QUARTERS of refreshment, is the place to which the troops that have been much fatigued are sent to refresh themselves during a part of the campaign.

Winter QUARTERS, the places in which the troops are lodged during the winter, or their residence in those places.

QUARTER-MASTER, an officer in the army, whose business is to look after the quarters of the soldiers; of which there are several kinds, *viz.* The quarter-master general, whose business is to provide good quarters for the whole army. Quarter-master of horse, he who is to provide quarters for a troop of horse. Quarter-master of foot, he who is to provide quarters for a regiment of foot.

QUARTER, in the manege, as to work from quarter to quarter, is to ride a horse three times in upon the first of the four lines of a square; then changing your hand, to ride him three times upon the second; and so to third and fourth; always changing hands and observing the same order.

QUARTERS, with respect to the parts of a horse, is used in various senses: thus the shoulders and fore-legs, are called the fore-quarters, and the hips and hinder-legs, the hind-quarters. The quarters of a horse's foot, are the sides of the coffin, comprehending between the toe and the heel; the inner quarters, are those

those opposite to one another, facing from one foot to the other; and these are always weaker than the outside quarters, which lie on the external sides of the coffin. False quarters, are a cleft in the horn of a horse's hoof, extending from the coronet to the shoe. A horse is said to be quarter-cast, when for any disorder in the coffin we are obliged to cut one of the quarters of the hoof.

QUARTERS of a saddle, are the pieces of leather or stuff made fast to the lower part of the sides of a saddle, and hanging down below it.

QUARTERS, in a clock, are the little bells that sound the quarters in an hour.

QUARTER-CHORD, in mining, is seven yards and a quarter, which the miner has cross-ways of his vein, on either side, for liberty to lay his earth, stones, and rubbish on, and to wash and dress up his ore.

QUARTERS, in building, are those slight upright pieces of timber placed between the puncheons and posts, used to lath upon. These are of two sorts, single and double; the single quarters are sawn to two inches thick, and four inches broad; the double quarters are sawn to four inches square. It is a rule in carpentry, that no quarters be placed at a greater distance than fourteen inches.

QUARTER-ROUND, in architecture, is a term used by the workmen for any projecting moulding in general, whose contour is a perfect quadrant of a circle, or which approaches near that figure.

QUARTER-SESSIONS, a general court held quarterly by the justices of peace of each county. See *JUSTICES of peace*.

QUARTER-STAFF, a long staff borne by foresters, park-keepers, &c. as a badge of their office; and occasionally used as a weapon.

QUARTER-WHEELING, or **QUARTER of conversion**, in the military art, is the motion by which the front of a body of men is turned round to where the flank was, by taking a quarter of a circle. If it be done to the right, the man in the right-hand angle keeps his ground and faces about, while the rest wheel; if to the left, the left hand man keeps his place.

QUARTER-WIND, at sea, is a lateral or side-wind, which does not blow in stern, but a little aside of it.

This is the best of all winds, as bearing into all the sails; whereas a wind blowing full in stern, is kept off by the sails of the mizzen.

QUARTERING, in the sea-language, is disposing the ship's company at an en-

gagement, in such a manner as that each may readily know where his station is, and what he is to do. As some to the master, for the management of the sails; some to assist the gunners in traversing the ordnance; some for plying of the small shot; some to fill powder in the powder-room; others to carry it from thence to the gunners, in cartridges, &c.

When a ship under sail goes at large neither by wind, nor before a wind, but, as it were betwixt both, she is said to go quartering.

QUARTERING, in gunnery, is when a piece of ordnance is so traversed that it will shoot on the same line, or on the same point of the compass as the ship's quarter bears.

QUARTERING, in heraldry, is dividing a coat into four or more quarters, or quarterings, by parting, coupling, &c. that is by perpendicular and horizontal lines, &c. Columbiere reckons twelve sorts of quarterings, *viz.* party per pale, dividing the escutcheon from top to bottom; party per cross, dividing it from side to side; party of six pieces, when the escutcheon is divided into six parts; party of ten; of twelve; of sixteen; of twenty; and of thirty-two, when there are so many partitions. Others give the divisions in another manner: as party per cross; per pale; per chief; per pale in clave; per bend dexter; per bend sinister; per chevron; barry bendy of eight pieces; paleways of six pieces; barry of six pieces; barry of eight pieces; bendy of six; chequy; fusilly, or lozengy; bendy lozengy; barry bendy lozengy, or bend lozengy; gyronny; barry lozengy counterchanged; waved of six pieces; barry nebule of six pieces; party per pale, and party per pale in point. See each of which under their respective articles.

Quartering is also applied to the partitions or compartments themselves; that is, to the several coats borne on an escutcheon, or the several divisions made in it, when the arms of several families are placed on the same shield, on account of intermarriages, or the like.

Quartering is also used for distinguishing younger brothers from the elder.

In blazoning, when the quartering is performed per cross, the two quarters a-top are numbered the first and second; and those at bottom, the third and fourth; beginning to tell on the right side. When the quartering is by a saltier, &c. the chief and point are the first and second quarters, the right side the third, and the left

left the fourth. See pl. CCXXV. fig. 2.

COUNTER-QUARTERING a coat, is when the quarters are subdivided each into four.

There are counter-quartered coats that have twenty or twenty-five quarters.

QUARTERING, or **QUARTERIZATION**, is part of the punishment of a traitor, which consists of dividing his body into four quarters.

QUARTERLY, in heraldry. A person is said to bear quarterly, when he bears arms quartered. See **QUARTERING**.

QUARTERN, a diminutive of quart, signifying a quarter of a pint. See the article **MEASURE**.

QUARTILE, an aspect of the planets. See the article **ASPECT**.

QUARTO, or 4to, a book of which four leaves, or eight pages make a sheet.

QUARTO-DECIMANS, *quarto-decimani*, an antient christian sect, so called from their maintaining that the festival of Easter ought to be celebrated, conformably to the custom of the Jews, on the fourteenth day of moon in the month of March, whatever day of the month that happened to be.

QUASHING; in law, the overthrowing and annulling of any thing.

QUASI-CONTRACT, in the civil law, an act which has not the strict form of a contract, but yet has the force of one.

Thus if one person does another's business in his absence, without his procuration, and it has succeeded to the other person's advantage; the one may have an action for what he has disbursed, and the other to make him give an account of his administration: which amounts to a quasi-contract.

QUASI-CRIME, or **QUASI-DELIOT**, in the civil law, is the act of doing a person an injury, involuntarily; which is to be repaired by making good the damage with interest.

QUASI MODO SUNDAY, or **LOW EASTER SUNDAY**, the next Sunday after Easter: so called from the beginning of the introit of the mass for the day, *quasi modo geniti infantes*.

QUATER-COUSINS, fourth cousins, or the last degree of kindred.

QUATRE-NATIONS, four nations, the name of a college founded by cardinal Mazarin, for the education and maintenance of sixty children natives of the four countries conquered by the king, viz. Pignerol, Allatia, Flanders, and Roussillon.

QUATUOR VIR, in antiquity, formerly written IIII. VIR, a roman magistrate

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who had three colleges joined with him in the same administration, and had the care of conducting and settling the colonies sent into the provinces.

There were also quatuor-viri appointed to inspect and take care of repairs, &c.

QUAVER, in music, a measure of time equal to half a crotchet, or an eighth of a semibreve;

The quaver is divided into two semiquavers, and four demisemiquavers. See the article **CHARACTERS in music**.

QUAVERING, in music, trilling or shaking; or the running a division with the voice.

QUAY, or **KAY**. See the article **WHARF**.

QUEBEC, the capital of Canada, in North America, situated on the west side of the river of St. Lawrence, 300 miles north-west of Boston in New England: west long. 74°, north lat. 47° 5'.

QUEEN, *regina*, a woman who holds a crown singly.

The title of queen is also given by way of courtesy to her that is married to a king, who is called by way of distinction queen-consort; the former being termed queen-regent. The widow of a king is also called queen; but with the addition of dowager.

A queen-regent is in the construction of law the same with a king, and has the same power in all respects. See **KING**.

A queen-consort is inferior to the king, and is really his subject, though, as the king's wife, she has several prerogatives above other women. Though an alien, she may purchase lands in fee-simple, without either naturalization or denization. She may present to a benefice. She shall not be amerced if she be nonsuited in any action; and may not be impleaded till first petitioned. To conspire her death, or violate her chastity, is high treason. She has an antient peculiar revenue called queen-gold; besides a very large dower, with a royal court, and officers of her own. No person here must marry a queen-dowager without the licence of the succeeding king, on pain of forfeiting his lands and goods: but tho' she marry any of the nobility, or even one under that degree, she does not lose her dignity.

QUEEN'S COUNTY, a county of Ireland, bounded by King's county, on the north; by Kildare, on the east; by Kilkenny, on the south; and by the province of Munster, on the west.

QUEEN'S FERRY, a town of Scotland, on the

the south side of the river Forth, ten miles west of Edinburgh.

QUEEN'S GOLD, a royal revenue that belongs to the queen of England, during her marriage to the king, and payable by divers persons upon several grants of the king, by way of oblation, out of fines amounting to ten marks, or upwards, *viz.* one tenth part above the intire fine, or ten pounds for every hundred pounds fine, on pardons, contracts, or agreements; which become a real debt to the queen, on the party's bare agreement with the king for his fine, and recording it, without any farther promise or contract.

QUEENBOROUGH, a borough town of the isle of Sheppy, in Kent, twelve miles north-west of Canterbury.

It sends two members to parliament.

QUE-ESTATE, in law, a plea whereby a man intitling himself to land, &c. says, that the same estate which another had, he now has from him.

QUE EST MEME, in law, is a term used in actions of trespass, &c. for a direct and positive justification of the very act complained of by the plaintiff.

QUERCUS, the **OAK TREE**, in botany. See the article **OAK**.

QUERCY, the south-east division of the province of Guienne, in France, having Limosin on the north, and Languedoc on the south.

QUERELA, in law, an action or complaint exhibited in any court of justice. See the article **QUARREL**.

QUERELA AUDITA. See the article **AUDITA QUERELA**.

QUERELA CORAM REGE ET CONCILIO, is a writ by which a person is called to justify a complaint of a trespass made to the king himself, before the king and his council.

QUERIA, in botany, a genus of the triandria trigynia class of plants; the calyx of which is an erect, five leaved perianthium: it has no corolla; the fruit is a roundish capsule, consisting of three valves, and containing only one cell; the seed is single.

QUERRIES, or **EQUERRIES**. See the article **QUERRY**.

Gentleman of the QUERRY, an officer appointed to hold the king's stirrup, when he mounts on horseback.

QUEST, or **INQUEST**, an inquiry upon the oaths of an impannelled jury. See the article **INQUEST**.

QUEST, in hunting, the seeking out of hounds, or the venting or winding of spaniels.

QUESTION, *questio*, in logic, a proposition proposed by way of interrogation. See the article **PROPOSITION**.

QUESTOR, or **QUÆSTOR**, in roman antiquity, an officer who had the management of the public treasure.

The questorship was the first office any person could bear in the commonwealth, and gave a right to sit in the senate.

At first there were only two; but afterwards two others were created, to take care of the payment of the armies abroad, of the selling plunder, booty, &c. for which purpose they generally accompanied the consuls in their expeditions; on which account they were called peregrini, as the first and principal two were called urbani.

The number of questors was afterwards greatly increased. They had the keeping the decrees of the senate: and hence came the two offices of questor principis, or augusti, sometimes called candidatus principis, whose office resembled in most respects that of our secretaries of state; and the quæstor palatii, answering in a great measure to our lord chancellor.

QUEUE, in heraldry, signifies the tail of a beast: thus if a lion be borne with a forked tail, he is blazoned doubled queued.

QUEUE D'ARONDE, or **SWALLOW'S TAIL**, in fortification, an out-work which is narrower at the gorge than at the front or face, being so called from its resemblance to a swallow's tail.

Of this kind are some single as well as double tenailles, and some horn-works whose sides are not parallel. See the articles **TENAILLE** and **HORN-WORK**.

When the front is narrower than the gorge, the work is denominated a contre queue d'aronde.

In carpentry, a queue d'aronde is more generally known by the name of dove-tail. See the article **DOVE-TAILING**.

QUIA IMPROVIDE, in law, a supersedeas issued on the behalf of a clerk of the court of chancery, sued contrary to the privilege of that court in the common pleas, and prosecuted to the exigent; and in several other cases, where a writ is erroneously sued.

QUICK, or **QUICKSET HEDGE**, among gardeners, denotes all live hedges, of whatever sort of plants they are composed, to distinguish them from dead hedges: but in a more strict sense of the word, it is restrained to those planted with the hawthorn, or *mespilus sylvestris*; under which name these young plants, or sets, are sold by the nursery-gardeners who

who raise them for sale. See HEDGE.

QUICK BEAM, *forbus sylvestris*. See the article SORBUS.

QUICK SILVER, in natural history, a ponderous mineral fluid, more usually called mercury. See the article MERCURY.

QUID, a term used in the schools for the definition of a thing; which is thus called, as answering to the question, *quid est?* what is it. See DEFINITION.

QUID JURIS CLAMAT, in law, a judicial writ which issues out of the record of a fine that remains with the custos brevium, before the same is engrossed; and it lies for the grantee of a reversion or remainder, where the particular tenant will not attorn.

QUID PRO QUO, in law, is the mutual consideration and reciprocal performance of both parties to a contract; as the giving one thing of value, for another of the like; and whatever contract is contrary thereto, the law terms it nudum pratum.

QUID PRO QUO is also used, in a physical sense, to express a mistake of an apothecary, in administering one medicine for another; or in using a different ingredient in a composition from that prescribed. See the article PRESCRIPTION.

QUIDDANY, or QUIDDENY, in pharmacy, conserve of quinces. See the articles QUINCE and MARMALADE.

QUIDDITY, *quidditas*, a barbarous term used in the schools for essence. See the articles ESSENCE and DEFINITION.

And hence what is essential to a thing, is said to be quiddative.

QUIETARE, in law, a term frequently met with in old deeds and conveyances, signifying to acquit, release, or discharge. See the article QUIETUS.

QUIETISTS, a religious sect, which made a great noise towards the close of the last century.

They were so called from a kind of absolute rest and inaction, which they supposed the soul to be in when arrived at that state of perfection which they called the unitive life; in which state, they imagined the soul wholly employed in contemplating its God, to whose influence it was entirely submissive, so that he could turn and drive it where and how he would. In this state, the soul no longer needs prayers, hymns, &c. being laid, as it were, in the bosom, and between the arms of its God, in whom it is in a manner swallowed up.

The mahometans seem to be no strangers to quietism. They expound a passage in the seventieth chapter of the Koran,

viz. *O thou soul, which art at rest, return unto thy Lord, &c.* of a soul, which having, by pursuing the concatenation of natural causes, raised itself to the knowledge of that being which produced them, and exists of necessity, rests fully contented, and acquiesces in the knowledge, &c. of him, and in the contemplation of his perfections.

QUIETUS, in law, is the same as freed or acquitted; being used by the clerk of the pipe, and auditors in the exchequer, in their discharges given to accounts; which generally conclude with these words, *abinde recessit quietus*, and is termed a *quietus est*; and being granted to a sheriff, discharges him of all accounts and demands due to the king.

QUILLS, the large feathers taken out of the end of the wing of a goose, crow, &c.

Quills are denominated from the order in which they are fixed in the wing, the second and third quills being the best for writing, as they have the largest and roundest barrels.

Crow-quills are chiefly used for drawing. In order to harden a quill that is soft, thrust the barrel into hot ashes, stirring it till it is soft, then taking it out, press it almost flat upon your knee with the back of a penknife, and afterwards reduce it to a roundness with your fingers. If you have a number to harden, set water and alum over the fire, and while it is boiling put in a handful of quills, the barrels only, for a minute, and then lay them by.

QUILT, a covering for a bed, formed of two pieces of silk, cotton, &c. quilted together.

QUILTING, a method of sewing two pieces of silk, linen, or stuff on each other, with wool or cotton between them; by working them all over in the form of chequer or diamond-work, or in flowers. The same name is also given to the stuff so worked.

QUINARIUS, in roman antiquity, a small coin equal to half the denarius. See the article COIN and DENARIUS.

QUINCE, *cydonia*, in botany, is comprehended by Linnæus under pyrus. See the article PYRUS.

Quinces, on being imported, pay a duty of 1s. 6 $\frac{4}{10}$ d. the hundred; and draw back, on exportation, 1s. 4 $\frac{70}{100}$ d.

The syrup of quinces, prepared of their juice with sugar, is an extremely pleasant and cooling medicine. The fruit is also very delicious, but is rough and astringent when eaten raw; it is said to cool and strengthen the stomach, remove

nauseousness, and stop fluxes of the belly.

QUINCUNX, in roman antiquity, denotes any thing that consists of five twelfth parts of another, but particularly of the as. See the article **UNCIA** and **As**.

QUINCUNX ORDER, in gardening, a plantation of trees, disposed originally in a square; and consisting of five trees, one at each corner, and a fifth in the middle: or a quincunx is the figure of a plantation of trees, disposed in several rows, both length and breadthwise, in such a manner, that the first tree in the second row commences in the center of the square formed by the two first trees in the first row, and the two first in the third, resembling the figure of the five at cards. This disposition of trees was formerly much more regarded than at present; but is still much used in France, for planting trees to form a grove, and is expressed by the asterisks in plate **CCXXV**. fig. 3.

QUINCUNX, in astronomy, an aspect of the planets, when 150° or five signs asunder. See the article **ASPECT**.

QUINDECAGON, in geometry, a plain figure with fifteen sides and fifteen angles; which, if the sides be all equal, is termed a regular quindecagon, and irregular when otherwise.

The side of a regular quindecagon inscribed in a circle, is equal in power to the half difference between the side of the equilateral triangle, and the side of the pentagon, inscribed in the same circle; also the difference of the perpendiculars let fall on both sides, taken together.

QUINDECENVIRI, in roman antiquity, a college of 15 magistrates, whose business it was to preside over the sacrifices.

They were also the interpreters of the Sibyl's books; which, however, they never consulted but by an express order of the senate.

QUINQUAGENARIUS, in roman antiquity, an officer who had the command of fifty men.

QUINQUAGESIMA SUNDAY, shrove Sunday, so called as being about the fiftieth day before Easter.

QUINQUATRIA, in roman antiquity, festivals celebrated in honour of Minerva, with much the same ceremonies as the panathenæa were at Athens. See **PANATHENÆA** and **MINERVALIA**.

QUINQUEFOLIUM, **CINQUEFOIL**, in botany, is comprehended by Linnæus under **POTENTILLA**. See **POTENTILLA**.

QUINQUENNALIS, in roman antiquity, a magistrate in the colonies and municipal cities of that empire, who had much

the same office as the ædile at Rome. See the article **ÆDILE**.

QUINQUEREMIS, in antiquity, a galley with five rows of oars. See **GALLEY**.

QUINQUEVIRI, in roman antiquity, an order of five priests, peculiarly appointed for the sacrifices to the dead, or celebrating the rites of Erebus.

QUINQUINA, or **QUINAQUINA**, in pharmacy, the peruvian, or jesuits-bark, or the bark of the tree called by Linnæus *cinchona*. See the article **CINCHONA**.

The peruvian bark should be chosen fresh, and of a bright colour, approaching to that of cinnamon, and of a strong taste. The smaller pieces, in quills, are generally the best; the larger, and flatter fragments having less virtue. We sometimes meet with it cut into thin slices, and of a yellower colour than ordinary: this is the bark of the root, has a very strong taste, and is esteemed by the Spaniards the choicest of all.

The peruvian bark possesses the stomachic virtues of the other bitters, and that in so eminent a degree, that it is a question whether any of the stomachics are equal to it: it strengthens the stomach, promotes the appetite, and assists digestion; it dissipates flatulencies, and is a very good medicine against worms. Its great virtue, however, is as a febrifuge: it cures all intermittents safely and speedily, if properly given. Its febrifuge virtue was discovered to us by the Indians, among whom it had been many ages known, and first discovered by a person's being cured of an intermittent, by drinking the water of a pond, where some trees of it had accidentally fallen. It was not discovered to any body in this part of the world till 1640, when a Spaniard, the governor of the city of Loxa, who had behaved well to some of these people, had the discovery as a reward. With the new medicine he cured the viceroy's lady of a tertian, after she had tried every thing else in vain. Hence it was called the countess's powder. After this, the jesuits brought over a vast quantity, which was, in 1694, distributed all over Europe, and did great cures. It was then called *pulvis patrum*, and jesuits-powder; and the cardinal de Lugo having bought up a vast quantity of it for the poor and others, it was afterwards called cardinal Lugo's powder.

QUINSEY, or **QUINZY**. See **QUINZY**.

QUINTAL, in commerce, the same with hundred-weight. See **WEIGHT**.

QUINTESSENCE, *quinta essentia*, in chemistry,

mistry, a preparation consisting of the essential oil of some vegetable substance mixed and incorporated with spirit of wine: thus, on a proper quantity, *e. g.* of essential oil of fennel, pour twelve times the quantity of pure alcohol distilled from alcali, so as to contain not the least water: shake them together, and the oil will disappear, and intimately mix with the alcohol, so as to form one simple and transparent liquor. If such quintessence be several times digested, cohobated, &c. with a gentle fire, the oil will at length be made so volatile as in great measure to rise along with the alcohol: whence oils are rendered more moveable and more subtile, and are exhausted to the highest degree of penetrability, like that of spirit, though still retaining their native virtues: but if with a fire only of ninety degrees, a mixture of alcohol and these oils be distilled, the alcohol will rise by itself, or only carry with it the presiding spirit from the oil, leaving the oily part behind; and if with great caution the thinner part be several times separated from the thicker, by repeated gentle cohobations, the alcohol will at length be so impregnated with those spirits, as to appear almost pure spirit itself; leaving a gross exhausted oil behind.

Quintessences thus prepared have great medicinal virtues: thus if a single drop of quintessence so made with oil of cinnamon, be mixed and drank with a glass of spanish-wine, it instantly gives a grateful briskness to the flagging spirits, and therefore proves an admirable remedy in faintings, suffocation, and want of spirits. All these preparations have a great affinity with fire; for being taken inwardly, they heat the body, and if the quantity be large, scorch and burn it: when applied externally they produce all the effects of a sharp inflammation, &c. Dry quintessences may be made from the liquid ones; by adding to them some more essential oils of the same vegetable form whence the liquid quintessence was procured, with a little sugar, all mixed together by a gentle heat, till all the moisture is come over, the matter remaining then is a dry quintessence.

QUINTESSENCE, in alchemy, is a mysterious term, signifying the fifth, or last and highest essence, or power of a natural body.

QUINTILE, *quintilis*, in astronomy, an aspect of the planets, when they are 72 degrees distant from one another, or a fifth part of the zodiac,

QUINTILIANS, a sect of antient heretics, thus called from their prophetess Quintilia. In this sect the women were admitted to perform the sacerdotal and episcopal functions. They attributed extraordinary gifts to Eve for having first eaten of the tree of knowledge; told great things of Mary the sister of Moses, as having been a prophetess, &c. They added, that Philip the deacon had four daughters who were all prophetesses and were of their sect. In these assemblies it was usual to see the virgins entering in white robes, personating prophetesses.

QUINTIN, or St. QUINTIN, a town of Picardy, in France, 35 miles east of Amiens.

QUINZY, QUINSEY, or ANGINA, in medicine, a pain and inflammation of the fauces, a swelling of the uvula, tonsils, and larynx, which being accompanied with a fever, occasions a difficulty of respiration and deglutition. This disease generally prevails about the latter end of spring or beginning of summer. When the swelling pain and redness appear mostly on the outsides, it is, according to Hoffman, the prognostic of a happy solution of the disease: but when the external swelling suddenly disappears, without a mitigation of the symptoms, it shews the morbid matter to be translated elsewhere, and that the disease will change to a phrenzy, or peripneumony. This disease may also terminate in a suppuration, gangrene, or schirrus. A frothing at the mouth, the tongue vastly swelled, and of a purple, blackish colour, portend death.

The quinzy is generally distinguished by modern writers into the idiopathic and symptomatic. The first, where it is itself the disease, and owes its origin only to a plethora; the second, where it is but the accidental symptom of an inflammatory fever, or some other disease, about the time of its crisis. See the article INFLAMMATORY FEVERS.

Dr. Mead distinguishes the quinzy into three sorts; the first of which he calls the watery quinzy; the second, a gangrene of the tonsils; and the third a strangulation of the fauces. In the first sort, the glands of the mouth, palate, and neighbouring parts are swoln. In the second, an inflammation without a perfect suppuration seizes the tonsils, which swell and grow hard; a gangrene soon ensues, which, if not speedily relieved, proves fatal. See GANGRENE. In the third sort, all the nerves are convulsed,

vulsed, and the patient drops down dead suddenly: however this species of the quinzy, though described by Hippocrates, is yet very rare. If it can be foreseen, it ought to be prevented by evacuations of all kinds; that is, bleeding, purging, blistering, issues, and diuretics; and it will be of service to practise abstinence, or a moderation in eating and drinking. In the watery-quinzy, which sometimes rages like an epidemic fever especially in places near the sea, bleeding plentifully as soon as possible is recommended; afterwards clysters, gentle purges, blisters under the chin, and on the sides of the neck; and if this course does not succeed, the palate must be pretty deeply scarified about the tongue and sublingual veins.

In these inflammations in general, a slight diarrhoea relieves the patient, according to Arbuthnot. Therefore aliments which promote it are of service; such are tamarinds infused in whey, decoctions of farinaceous vegetables moderately acidulated, and such as abound with a cooling nitrous salt are useful. Burnet is said to be a specific in the quinzy; mulberries, and all acids are beneficial. The mouth and throat must be kept moist, and the nose clear, that the air may have a free passage thro' it. Sydenham orders to bleed plentifully in the arm, and Boerhaave directs it to be by a large orifice. Afterwards a sublingual vein should be opened; but, according to Hoffman, bleeding in the jugular yields the best assistance. If the symptoms continue to be very urgent, the bleeding may be repeated in six or eight hours time, till they begin to be more mild. After the first bleeding, Sydenham orders a strong and large blister to be laid to the neck: then let the parts inflamed be touched with the following mixture. Take honey of roses, as much as you please; and mix it with as much spirit of sulphur as is sufficient to give it the greatest sharpness. Afterwards the following gargle is to be held in the mouth till it is hot; and is to be repeated pretty often: take plantain-water, and frog-spawn, of each four ounces; red roses, four ounces; the whites of three eggs beat in water; and two drams of crystal sugar.

When the fauces are dry, hot, and the tongue swells, with difficulty of breathing and swallowing, Hoffman orders to take of the whites of eggs beat in water, two ounces; water of roses, one ounce;

sal prunella, twelve grains; syrup of quinces, one ounce. Make a linclous, which is to be taken often; and let the neck be anointed as well behind as before with the following camphorated oil. Take of the oil of sweet almonds, one ounce; oil of white poppies, one dram; camphor, half a dram; after which let the patient take a cooling emulsion.

Boerhaave, after bleeding, orders a strong purge, and if that cannot be taken, a strong clyster. Emollient steams, or even the steam of hot water taken in at the mouth is beneficial. If the patient is not able to swallow any nourishment, take of good broth of flesh-meat, ten ounces; nitre, ten grains; spirit of salt, six drops; make a clyster to be injected every eight hours, and retained as long as is possible. Hoffman says, that if the tumour tends to a suppuration, it is best promoted by holding dried figs in the mouth, and that when the tonsils are full of an inflammatory ichor, honey of roses, mixt with spirit of vitriol, and often applied to the part with a pencil, is excellent. In a latent internal exceeding hot quinzy, the mouth must be frequently moistened with milk or cream, with an addition of sal prunella, and syrup of poppies.

Dr. Pringle observes, that the inflammatory quinzy is the most frequent, as well as dangerous among soldiers, upon their first encampment; and that its tendency to bring on a suffocation, indicates the necessity of speedy and large bleedings, purging, and blistering. He also recommends the following application, as one of the most efficacious remedies in this terrible disorder: let a piece of thick flannel be moistened with equal parts of any common oil and of spirit of hartshorn, and applied to the throat, to be renewed once in four or five hours: this medicine, he tells us, he had from Dr. Young, physician in Edinburgh. By means of this application, the neck, and sometimes the whole body, is put into a sweat; which, after bleeding, either carries off or lessens the inflammation. He also tells us, that he has observed little benefit arising from gargles, and that the acid ones did more harm than good: however, a decoction of figs in milk and water, especially if the spirit of sal ammoniac be added, serves to thin the saliva, whereby the glands secrete more freely; a circumstance always conducive to the cure.

In the philosophical transactions, the jelly of black currants, swallowed down leisurely in small quantities, is asserted to be a specific for a quincy; and a decoction of the leaves or bark in milk, when the jelly cannot be had, used as a gargle, is said to cure all the inflammatory distempers of the throat that happen in the winter-time.

In malignant fevers, when there is an inflammation of the oesophagus, Hoffman orders to take nitre, one dram; camphor, three grains; sugar, one ounce; make a powder, which is to be given in an emulsion of sweet almonds, and may also be held in the mouth for some time before it is swallowed. That inflammatory pain which arises from a sharp salt serum in the glandulous parts of the fauces with redness and a copious flux of saliva, but without a fever, may be cured with a gargle of brandy alone. When there is a large defluxion of an impure serous humour upon the fauces, it requires a frequent use of gentle laxatives. When the symptoms of a quincy are so urgent, that the patient is in immediate danger of strangling, recourse must be had to bronchotomy, or opening of the wind-pipe. See BRONCHOTOMY.

The method of preventing an inflammation of the uvula, in a prolapsion thereof, from spreading through the fauces and exciting a quincy, may be seen under the article PROLAPSUS UVULÆ.

QUIRE of paper, the quantity of 24 or 25 sheets.

QUIRISTER, or CHOIRISTER, a person appointed to sing in the choir of a cathedral. See CHANTOR, CHOIR, &c.

QUIRINALIA, in antiquity, a feast celebrated among the Romans in honour of Romulus, who was called Quirinus. These feasts were held on the 13th of the calends of March.

QUIRITES, in antiquity, a name given to the people of Rome, chiefly the common citizens, as distinguished from the soldiery.

QUIRK, in building, a piece of ground taken out of any regular ground-plot, or floor: thus if the ground-plot were oblong or square, a piece taken out of a corner to make a court or yard, &c. is called a quirk.

QUI-TAM, in law, is where an action is brought, or an information exhibited against a person, on a penal statute at the suit of the king, and the party or informer, when the penalty for breach of the statute is directed to be divided between

them; in that case, the informer prosecutes as well for the king as himself.

QUIT-CLAIM, in law, signifies a release of any action that one person has against another. It signifies also a quitting a claim or title to lands, &c.

QUIT-RENT, in law, a small rent that is payable by the tenants of most manors, whereby the tenant goes quit and free from all other services; and it is said to be an acknowledgment, in token of subjection to the lord. Antiently this payment was called white rent, on account that it was paid in silver-coin, and to distinguish it from rent-corn.

QUITTANCE. See ACQUITTANCE.

QUITTER-BONE, among farriers, a hard round swelling upon the coronet of a horse's foot, or between the heel and the quarter; sometimes occasioned by gravel under the shoe; or by a bruise, stab, or prick of a nail. This swelling comes to a head in four or five days, and breaks out with matter at a little deep hole, like a fistula.

QUOAD HOC, is a term used in the pleadings and arguments of lawyers; being as much as to say, as to this thing the law is so and so, &c.

QUOD *clerici non eligantur in officio ballivi*, is a writ that lies for a clerk, who, on account of lands he is possessed of, is created bailiff, or some other like officer.

QUOD *ei deforceat*, a writ that lies for a tenant in tail, tenant in dower, or for term of life, having lost lands by default, against the person who recovered, or against his heir. It is said, this writ may be likewise brought against a stranger; as where a person recovers by default, and then makes a feoffment of the land; in that case, the feoffee is answerable, &c. and when a tenant in tail, or any tenant that has a particular estate in the lands, loses on a default where he is not summoned, &c. he may have either a disceit or this writ, though his heirs after his death shall not have it, but are to bring a formedon.

QUOD *permittat*, in law, a writ which lies for the heir of him that is disseised of common or pasture, against the heir of the disseisor who is dead. And it is held, that where a person's ancestor died seised, or if one be disturbed by another in his common of pasture, or other such thing annexed to his inheritance, he shall have this writ against the deforcer.

QUOD *non permittat*. See the article CONSUETUDINEUS.

QUOD *persona nec prebendarii, &c.* a writ that lies for spiritual persons, when distressed in their spiritual possessions, for the payment of a fifteenth, with the rest of the parish.

QUOIL, or **COIL**, in the sea-language, a rope or cable laid up round, one fack or turn over another, so that it may the more easily be stowed out of the way, and also run out free and smooth, without twistings or doublings.

QUOIN, or **COIN**, on board a ship, a wedge fastened on the deck close to the breech of the carriage of a gun, to keep it firm up to the ship side.

Cantic quoins are short three-legged quoins put between casks to keep them steady.

QUOINS, in architecture, denote the corners of brick or stone walls. The word is particularly used for the stones in the corners of brick-buildings. When these stand out beyond the brick-work, their edges being chamfered off, they are called rustic quoins.

QUOITS, a kind of exercise or game known among the antients under the name *discus*. See the article **DISC**.

QUO JURE, in law, a writ that lies where a person has lands in which another claims common of pasture time out of mind; and it is brought in order to compel the person to shew by what title he challenges the common.

QUO MINUS, is also a writ which issues out of the court of exchequer to the king's farmer or debtor, for debt, trespass, &c. Though this writ was formerly granted only to the king's tenants or debtors, the practice now is become general for the plaintiff to surmise, that by the wrong the defendant does him, he is the less able to satisfy his debt to the king, by which means jurisdiction is given to the court of exchequer to determine the cause. This writ is to take the body of the defendant in like manner as the *capias* in the common pleas, and the writ of *latitat* in the king's bench.

QUORUM, a word frequently mentioned in our statutes, and in commissions both of justices of the peace and others. It is thus called from the words of the commission, *quorum A. B. unum esse volumus*. For an example, where a commission is directed to seven persons, or to any three of them, whereof A. B. and C. D. are to be two; in this case, they are said to be

of the *quorum*, because the rest cannot proceed without them: so a justice of the peace and *quorum* is one without whom the rest of the justices in some cases cannot proceed.

QUOTATION, in literature, a citation, or passage, rehearsed expressly in one author from another.

Quotations are usually distinguished by inverted commas.

QUOTIDIAN, *quotidiana*, in medicine, an intermitting fever, or ague, the paroxysm or fit whereof returns every day. See the article **INTERMITTENT**.

This species of intermitting fevers is not so common as the tertian and quartan. See **TERTIAN** and **QUARTAN**.

It attacks the patient early in the morning, with chillness and shivering; to which succeed a *cardialgia*, nausea, and inflation of the belly; in some a pain in the head, in others fainting fits, and in most vomiting or stools, or both; after which comes on the hot fit, with thirst. As to the cure, the best method seems to be first to attenuate the tough and vitiated humours in the stomach and intestines, by proper doses of vitriolated tartar, and the like; after which a gentle emetic, diaphoretics and diluents are to be administered; and lastly, the bowels are to be strengthened by bitters and sub-astringents; among which, the peruvian bark claims a place, only to be used in smaller quantities than when trusted to alone for the cure.

QUOTIENT, in arithmetic, the number which arises by dividing the dividend by the divisor. See **DIVISION**.

QUO WARRANTO, in law, a writ which lies against a person or corporation, that usurps any franchise or liberty against the king; as to have a fair, market, or the like, in order to oblige the usurper to shew by what right and title he holds or claims such franchise.

This writ also lies for mis-user, or non-user of privileges granted.

The attorney-general may exhibit a *quo warranto* in the crown-office against any particular persons, or bodies politic or corporate, who use any franchise or privilege, without having a legal grant, or prescription for the same; and a judgment obtained upon it is final, as being a writ of right.



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